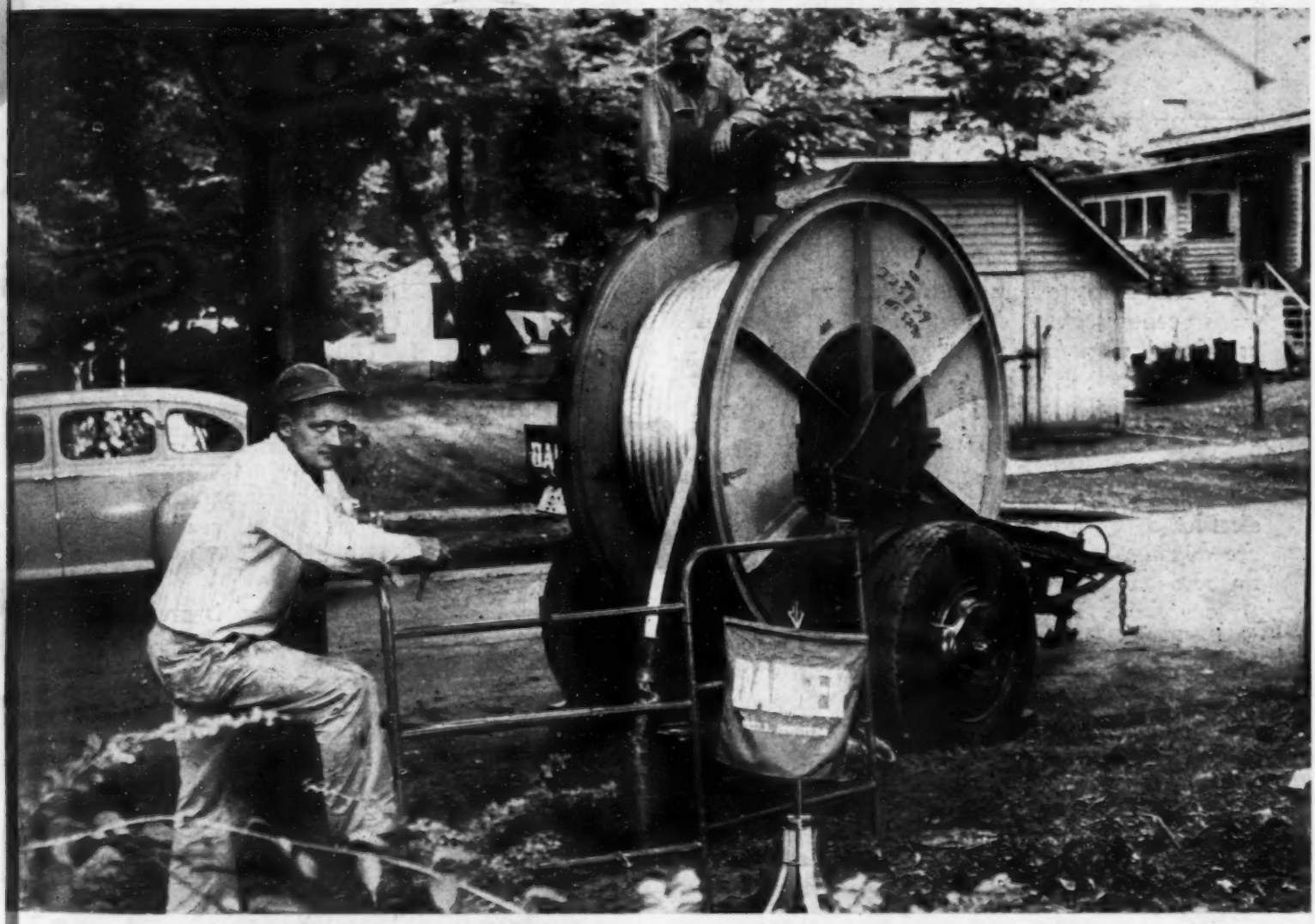
TELEPHONE ENGINEER and MANAGEMENT



AUGUST, 1948

DAINGERFIELD, TEXAS

LIKE many other small American industrial centers of the new era, DAINGERFIELD began as a farming town — where sweet and Irish potatoes, watermelons, peanuts, corn and cotton grew abundantly. In fact, for many years cotton ginning and milling were the main economical pursuits of this area.

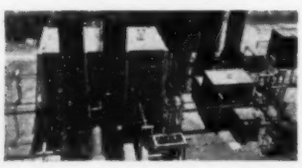
Then an evergrowing demand for iron and steel led to a "re-discovery" of the unlimited iron ore deposits in and around DAINGERFIELD. The huge Lone Star Steel plant was built to help develop these deposits. With a peak operating capacity of 500 tons of pig iron daily, the Lone Star Steel Company became the city's stimulus for unprecedented growth.

Extracting ore from the ground and developing it and its by-products for their many uses involves *highly specialized* knowledge and training. Planning and publishing telephone directories also requires *specialized* knowledge and training. Recognizing this, the SOUTHWESTERN ASSOCIATED TELEPHONE COMPANY serving DAINGERFIELD employs us to publish directories for that area.

DAINGERFIELD is just one of more than 1000 towns and cities with telephone companies served by us. The attractive, accurate directories we publish are a source of increased operating revenue as well as valuable public relations tools for the companies issuing them.

Our specialized organization is well trained and equipped to provide each telephone company we serve with a complete directory service—suited to that company's individual requirements.

Let us submit a complete Directory Service Plan to fit the particular needs of your company. No obligation.



GENERAL TELEPHONE DIRECTORY COMPANY

EASTERN OFFICE: 185 NORTH WABASH AVENUE, CHICAGO 1, ILLINOIS, TELEPHONE STATE 5478
WESTERN OFFICE: PRESS-TELEGRAM BUILDING, LONG BEACH 12, CALIFORNIA, TELEPHONE 6-7221

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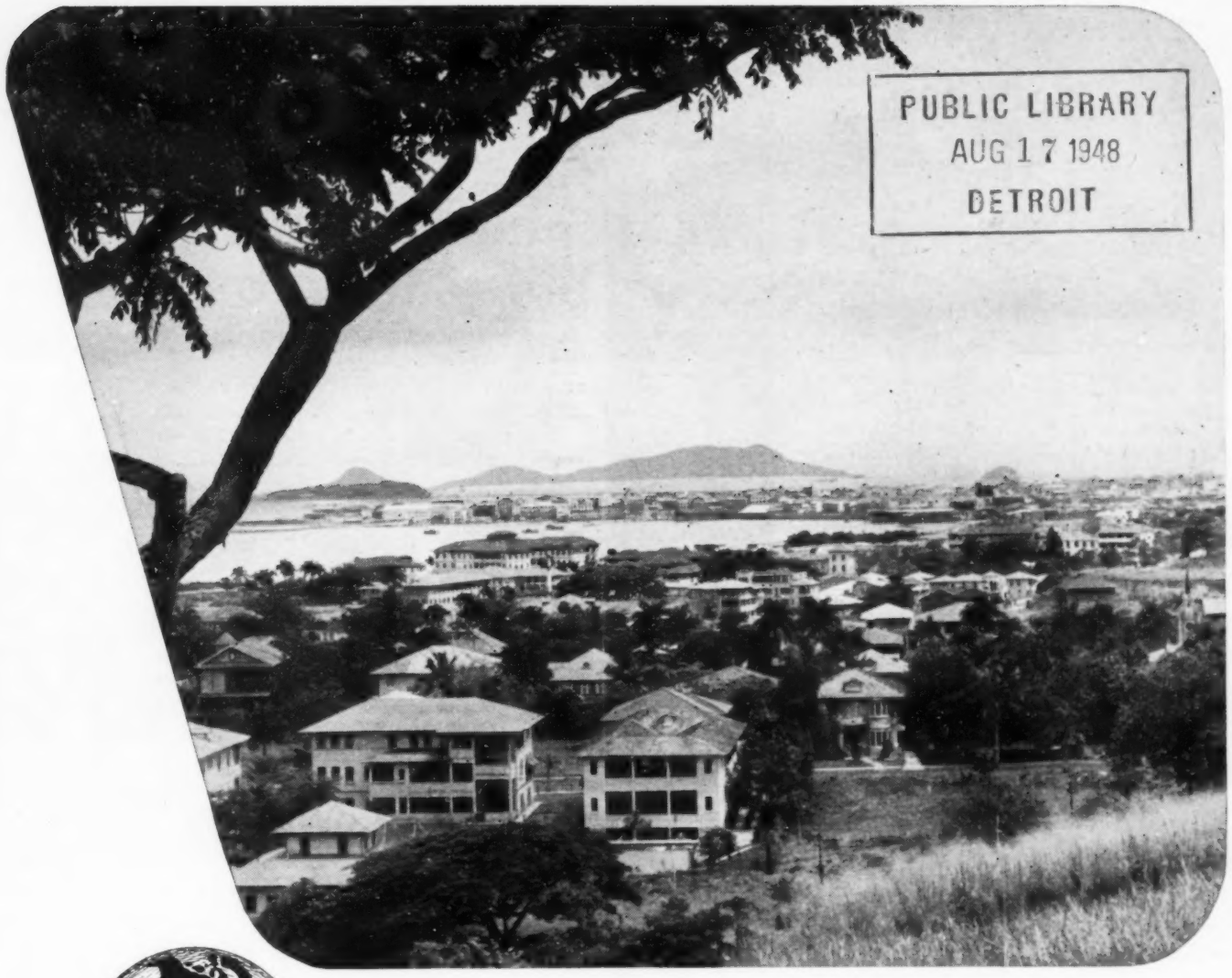

33 YEARS AGO THIS MONTH

Telephone service reached down into Panama

Far distant telephone communication had become of vital importance on August 27, 1915, when speech was first transmitted between Arlington, Va. and Panama. World War I was raging in Europe, the Lusitania had just been sunk and, only a month before, U. S. warships had passed through the canal for the first time.

Thanks to the newly developed vacuum tube amplifiers, radiotelephone service in 1915 began spreading far and fast . . . from Arlington to San Francisco . . . to Hawaii . . . across the Atlantic to Paris.

Telephone history continues to show that as new communication needs arise, the industry is ready to meet them with promptness and dependability.

In Exide Batteries you will find the same dependability for which telephone service is famous throughout the world. For more than half a century, Exide Batteries have been proving themselves worthy of that trust.

Exide®
BATTERIES

1888 . . . Dependable Batteries for 60 Years . . . 1948

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

IT SEEMS TO US...

Heartiest congratulation to the JACK CROWLEYS of Minnesota. August 14 is date of their golden anniversary and marks the 50th year of service to the telephone industry by Jack. As the dean of state telephone association executives Jack is known throughout the country for his outstanding contributions to the communications art as evidenced by his work in Minnesota and nationally.

• • •

JOHN BROWN COOK, president of Reliable Electric Co., Chicago and of the Whitney-Blake Co. and Koiled Kords, Inc. of New Haven, is the latest of those serving our industry to become internationally known as an author. His new book "Gems of Mental Magic" is now available. John, in case you wonder why his interest in authoring a book of this nature, is one of the best known amateur magicians in this country.

• • •

JIM KELLOGG, jovial and able president of the Kellogg Switchboard & Supply Company and chairman of the USITA Banquet Committee, is a man of many hobbies. We were sorry we were unable to join him and his party on a fishing trip in late July. Results were good, he reports. His USITA Committee also met last month to complete plans for the coming national convention in October. At that time he showed this writer something about the game of golf.

• • •

BILL MEREDITH of the W. C. Meredith Co., Inc. Atlanta, the pole people, has a unique way of informing the country that Georgia has two kinds of honies. A jar of Georgia honey arrived for us packed in one of the Meredith wood containers of hollowed wood. Bill and his company has served the telephone industry as far back as we can remember and his family is aiding him in carrying on the fine business they have built during the years.

The National Telephone Magazine

TELEPHONE ENGINEER and MANAGEMENT

AUGUST, 1948 VOL. 52, NUMBER 8

Editor, RAY W. SMITH • *Advertising Director*, ROY F. SMITH
Managing Editor, JOHN G. REYNOLDS • *Promotion Manager*, DON C. SORENSON
Washington Bureau, ROLAND C. DAVIES and FRED HENCK
Circulation Mgr., BERNADINE STEPHENS • *Production Mgr.*, MARGARET INDIA

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Experience of a Small Company In Obtaining Rate Increase	LaMar Stoops	40
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COVER: Don Reid and Bob Carr at work on the large cable reel as the Northwestern Bell Telephone Company lays additional cable underground at Oskaloosa, Iowa. The $40,000 project will bring rural service to approximately 95 farm families. —Photo from Oskaloosa (Ia.) Herald.

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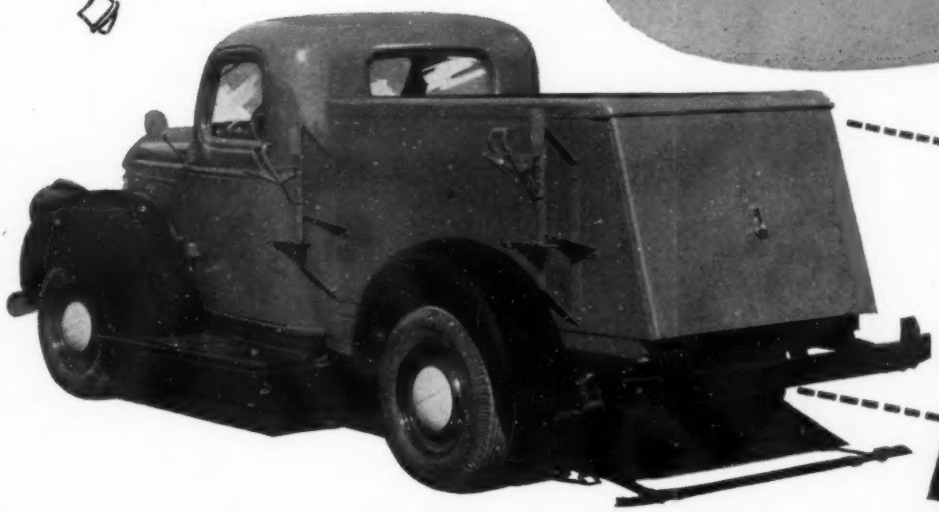
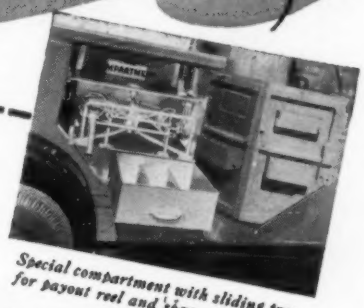
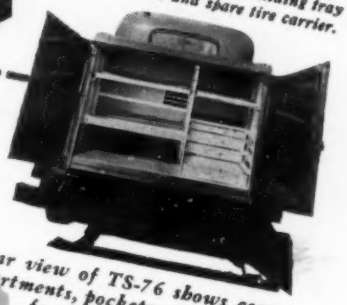
American TS-76 TELEPHONE BODY





Special compartment with sliding tray for payout reel and spare tire carrier.

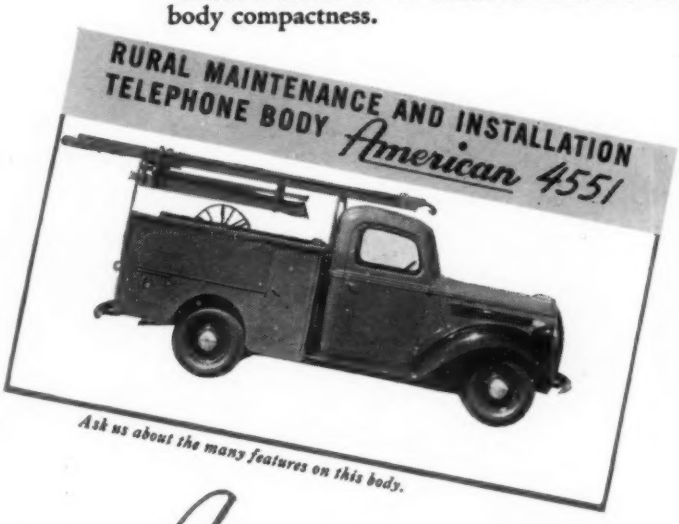


Rear view of TS-76 shows compartments, pockets and drawers for carrying equipment.

SPECIALIZED BODY USED FOR
Installation - Maintenance - General Service

Q. What makes this American Body, TS-76, so popular for telephone installation, maintenance and general service?

A. **Utility design — a place for everything. The outside features an "S" ladder and all-around body compactness.**



Ask us about the many features on this body.

Now, look inside (views at right). You find several trays (various depths and widths); material drawers with flexible compartments (movable partitions); a sliding shelf for payout reel and spare tire carrier; space for rubber goods, first aid kit, stepladder, instruments, long bits and other items.

The sliding shelf permits easy access to a fully loaded reel. When not in use, the shelf slides in place and the door (side opening) is closed and locked. Rear and side doors have special locks; trays have locks so they cannot move when truck is in motion.

Ask American about the TS-76, or if you have other requirements, remember American specializes in all types of bodies for utilities.

GENERAL DIMENSIONS

Overall width	47 inches
Overall length	80 inches
Inside height	29½ inches
Height from chassis to top	35 inches
Weight	700 pounds

(All figures approximate)

Bodies may be purchased in prime paint or finished to your standard color. They can be mounted on your chassis at our factory or can be crated and shipped for mounting at destination.

THE American COACH & BODY COMPANY

9503 WOODLAND AVE., CLEVELAND 4, OHIO

SALES and ASSEMBLY THE AMERICAN COACH AND BODY CO., CALIF. DIV., 432 FIFTH ST., OAKLAND 7, CALIF.
BAKER EQUIPMENT ENGINEERING CO., SUMMIT & NORFOLK STS., RICHMOND 11, VA.

OFFICES 350 MADISON AVE., NEW YORK 17, N. Y. INSURANCE EXCHANGE BLDG., DES MOINES 9, IOWA

ACB and

P-L* EARTH ANCHORS

*REA APPROVED

P-L ALL STEEL, EXPANDING TYPE EARTH ANCHORS

Here is the first really efficient, two-piece earth anchor that is of simple, fool-proof, all-steel, heavy-duty construction. P-L Earth Anchors are exceptionally rugged and possess tremendous holding power. P-L Anchors can do a better job and can be installed quicker in all types of soil. Everyone from the engineer to the lineman can appreciate the ease of handling and installation.

EASY TO INSTALL

P-L Anchors come to you as assembled units. Built of two simple pieces of heavy steel plate. A few blows of the tamping bar and the sharp edged blades cut deeply and permanently into solid, undisturbed earth.

FOR LITERATURE WRITE

PIEPER-LILLARD INCORPORATED
ST. LOUIS 1, MO.

The Open Forum

On Its Way . . .

Gentlemen:

I have been getting the TELEPHONE ENGINEER AND MANAGEMENT for about two months. I would like to get one of the new "Buyers Guides." I started a new telephone system at Charlo, Montana on July 1, and now have 27 telephones. I have a magneto system and own everything. I have about nine miles of poles set ready to put the wire on.

I have seen the new "Buyers Guide" and think it is a very nice book for any telephone exchange.

ORVAL L. ELLIOTT
CHARLO TEL. SYSTEM
CHARLO, MONT.

• • •

Listening In . . .

Dear Sir:

Your editorial in the May issue called to mind my early experience with farmer lines. Eight to ten local battery magneto instruments bridged across one line. In many cases it was an earth return line. It was open code ringing all the way.

At first we tried to discourage eavesdropping, but it could not be stopped. Then, from the stories told to us by the subscribers themselves, we discovered what a mutual help listening on the line had become. A cow strays off, Mrs. A calls westward to Mrs. B, asking about the cow. Mrs. C, living to the east, listening on the line, speaks up, that said cow has just strolled past her house. Again, two women are talking about some childhood disease which her child has. Another woman, hearing it, "chips in" with a new remedy or way of handling it. In these cases the farmers appreciated the exchange of information of all kinds.

Listening on the line rapidly became very common and was warmly defended by most of the rural subscribers.

With best wishes, I am

ARTHUR BESSEY SMITH
VICE PRESIDENT.
AUTOMATIC ELECTRIC LABORATORIES, INC.
CHICAGO, ILL.

• • •

"Thanks, Mr. Burton . . ."

Dear Ray:

We have received our copies of the 1948 BUYERS' DIRECTORY AND COMPOSITE CATALOG, and wish to compliment you on separating it into a single volume which may be filled with other documents for ready reference.

The Handbook material contained in Section 4 will be helpful to all, but more particularly to the smaller Operators who do not have an engineering department or technical information upon the items covered in same. You appear to have covered all of the fundamental items in connection with the average exchange operations.

On the whole you have done a good job, and I am sure it will be appreciated by your constituents.

OSCAR BURTON
VICE PRES. & GEN. MGR.
GULF STATES TELEPHONE CO.
TYLER, TEXAS.

• • •

" 'T. L.' From Ohio . . ."

Dear Ray:

Congratulations, even though somewhat late, to all of your organization on the splendid job it did on the BUYERS' DIRECTORY AND COMPOSITE CATALOG you recently sent us. It's certainly a fine job and you may well be proud of it.

LLOYD C. WRIGHT
OHIO INDEPENDENT TELEPHONE ASSOCIATION
COLUMBUS, OHIO.

• • •

". . . Fills A Definite Need . . ."

Dear Ray:

Your 1948 TELEPHONE BUYERS' DIRECTORY AND COMPOSITE CATALOG is an excellent publication and fills a definite need in the telephone industry. As a matter of fact, we have already used it to a very good advantage upon several occasions.

RAY DALTON
VICE PRES. & GEN. MGR.
WEST COAST TELEPHONE CO.
EVERETT, WASH.

• • •

". . . Thanks, Mr. Johnston . . ."

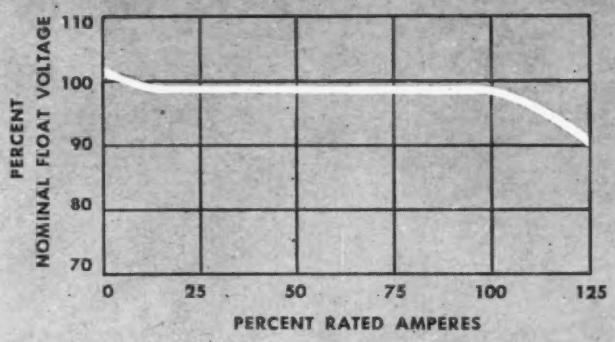
Dear Ray:

I have received the copy of TELEPHONE BUYERS' DIRECTORY and want to say it is complete in every detail and should be appreciated by telephone men. More power and glory to you.

J. K. JOHNSTON
INDEPENDENT PIONEER TEL. ASSOC.
INDIANAPOLIS, IND.

BATTERY-CHARGER FUNDAMENTALS—

how constant voltage increases battery life



Typical Voltage Regulation Curve of the E. P. Diverter-Pole Motor-Generator

Operating records of many exchanges show that the E. P. Diverter-Pole Battery Charger increases battery life from six to fourteen years. Its steady voltage eliminates the dangers of both *low* and *high* voltages. Batteries are maintained at their correct charge under a full floating system, to fully protect exchange requirements. High battery temperatures, excessive gassing, and undue breaking down of the active cell material are prevented to assure the longest possible battery life. Keeping a battery in a fully-charged condition at all times means that it is ready to furnish power at peak current demands beyond the capacity of the charger, and that it stands ready to provide emergency power in case of an interruption of the commercial power supply.

why EP motor-generators are best . . .

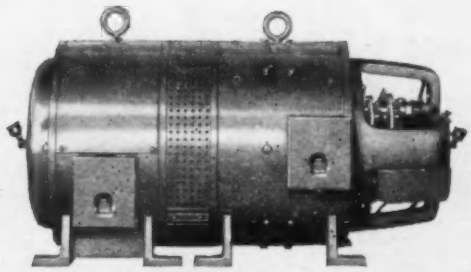
Since 1923, Diverter-Pole Motor-Generators have proved to be the most reliable, maintenance-free and efficient source of direct current for Telephone Exchanges. The characteristics of E. P. Diverter-Poles are ideal not only for the most satisfactory floating charge (a full floating charge is now the accepted standard), but also for carrying the major portion of the exchange load better than any other source of direct current.

The main reason for this superiority is that The Electric Products Company is a specialty manufacturer. For every exchange battery-charging application, E. P. designs and builds an individual Motor-Generator that fits exactly the requirements of the particular operation.

The result is Proved Performance as evidenced by the unequalled long-life records established by Diverter-Poles throughout the Telephone Industry.

For complete details . . .

ASK FOR BULLETIN 209



E. P. DIVERTER-POLE BATTERY CHARGERS

- Are completely automatic
- Control exchange voltage well within high-low limits at all times
- Lengthen battery life
- Are self-protecting against dangerous overloads
- Will not "run away" or reverse polarity

EP X-32

THE ELECTRIC PRODUCTS COMPANY

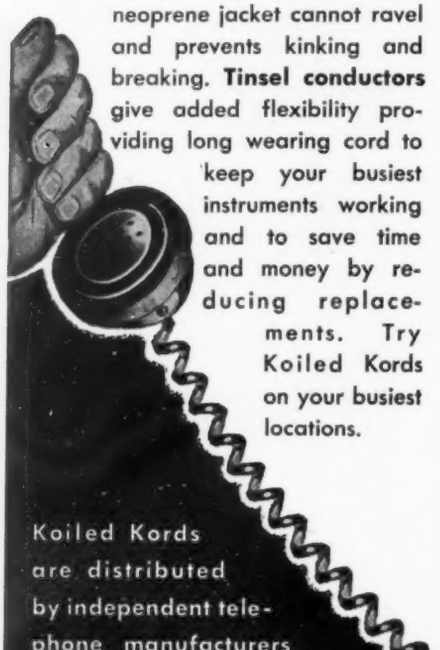
1727 CLARKSTONE ROAD CLEVELAND 12, OHIO

KOILED KORDS
ON
Busy Instruments

SAVE

on replacements
and maintenance

On overworked telephones such as house phones in hotels; on information desks; on double desks in busy offices; in brokerage houses and other troublesome locations, Koiled Kords can save you money. The strong neoprene jacket cannot ravel and prevents kinking and breaking. **Tinsel conductors** give added flexibility providing long wearing cord to keep your busiest instruments working and to save time and money by reducing replacements. Try Koiled Kords on your busiest locations.



Koiled Kords are distributed by independent telephone manufacturers and suppliers and, on the West Coast, by the Jewell-Summer Co., Los Angeles, Cal.

Koiled Kords
INCORPORATED
BOX K, HAMDEN, CONN.

MOBILE TELEPHONE SERVICE:—"I'm sure no one knows the ultimate possibilities of mobile telephone service. There can be no question that the service is filling a need and that it is opening up new possibilities in the communications field. Also, I am certain that the service will improve; that operation changes will be made if such are necessary to meet the customers' needs; and that the prices of equipment will be lowered with consequent reductions in rental charges. I was reading recently of the growth of overseas service. When this service was inaugurated in 1927 there were around 2,000 calls per year and each cost $75.00; now there are in excess of 500,000 and the rate is $9.00 New York to London at night.

"It seems to me that careful analysis would indicate that similar progress and improvement would occur in the mobile telephone service field, and that we, the communications industry, should be foremost in developing it to its utmost possibilities, having in mind as always the interest of the general public in providing the best possible service at the lowest possible cost."—**Merle M. Hale, general commercial superintendent, Lincoln (Neb.) T. & T. Co. Excerpt from address presented before recent convention of the Pennsylvania State Telephone Association.**

• • •

TELEPHONE DOLLARS:—"The telephone dollar is no more valuable than any other dollar. Its purchasing power has been reduced through rising prices of labor and materials. This is recognized widely by the public and regulatory bodies. A rate case filed now is aided by public recognition of current inflated price values. Next year or the year after may be too late."—**Walter Dakin, president Wisconsin State Telephone Association. Excerpt from address delivered at recent Wisconsin convention.**

• • •

SAME ALL OVER:—"An Independent telephone man told me not long ago that he was in a quandary, was bewildered and confused. 'Why,' he said, 'my lines are in good repair, I give dial service, I have good equipment, I charge fair and reasonable rates, I have good relations with my employees, I go to church on Sunday, I am a member of the Chamber of Commerce and the Board of Trade, I make regular contributions to charity, I vote the right ticket, I wear O'Sullivan's rubber heels, and yet my subscribers are not satisfied; I just don't understand.' It reminded me of the rather harrassed married man whose wife was waiting for him when he returned from the office one evening. At the dinner table she beamed at him and said, 'John, you don't seem to get the same kick out of kissing me that you used to.' John said, 'Well darling, conditions are bad everywhere.'

"And so they sometimes are in the telephone business. Conditions in the whole American economy are upset because worldwide conditions are disturbed. As a part of the American economy telephone companies can hardly expect to have immunity from the distresses which vex other forms of business enterprise.

"In the era that lies ahead we in the telephone business may expect still other periods that will try our patience. In seeking to solve our problems let us try to remember that the modern efficient telephone systems of this country are splendid examples of American foresight, ingenuity and leadership at their best. If we occasionally stumble let us remember it is only the worm that can't fall down."—**Clyde S. Bailey, USITA executive vice president. Excerpt from address delivered at recent convention of the Wisconsin State Telephone Association.**

Coordinated TO SERVE YOU ANYWHERE!

The **International AUTOMATIC ELECTRIC** *Group* is the engineering and distributing organization for four outstanding telephone manufacturing organizations, united under one banner for the production of communication apparatus of highest quality. From these manufacturers come Strowger Automatic telephone equipment, high quality wires and cables, and telephones that have won world-wide approval from operating companies and administrations.

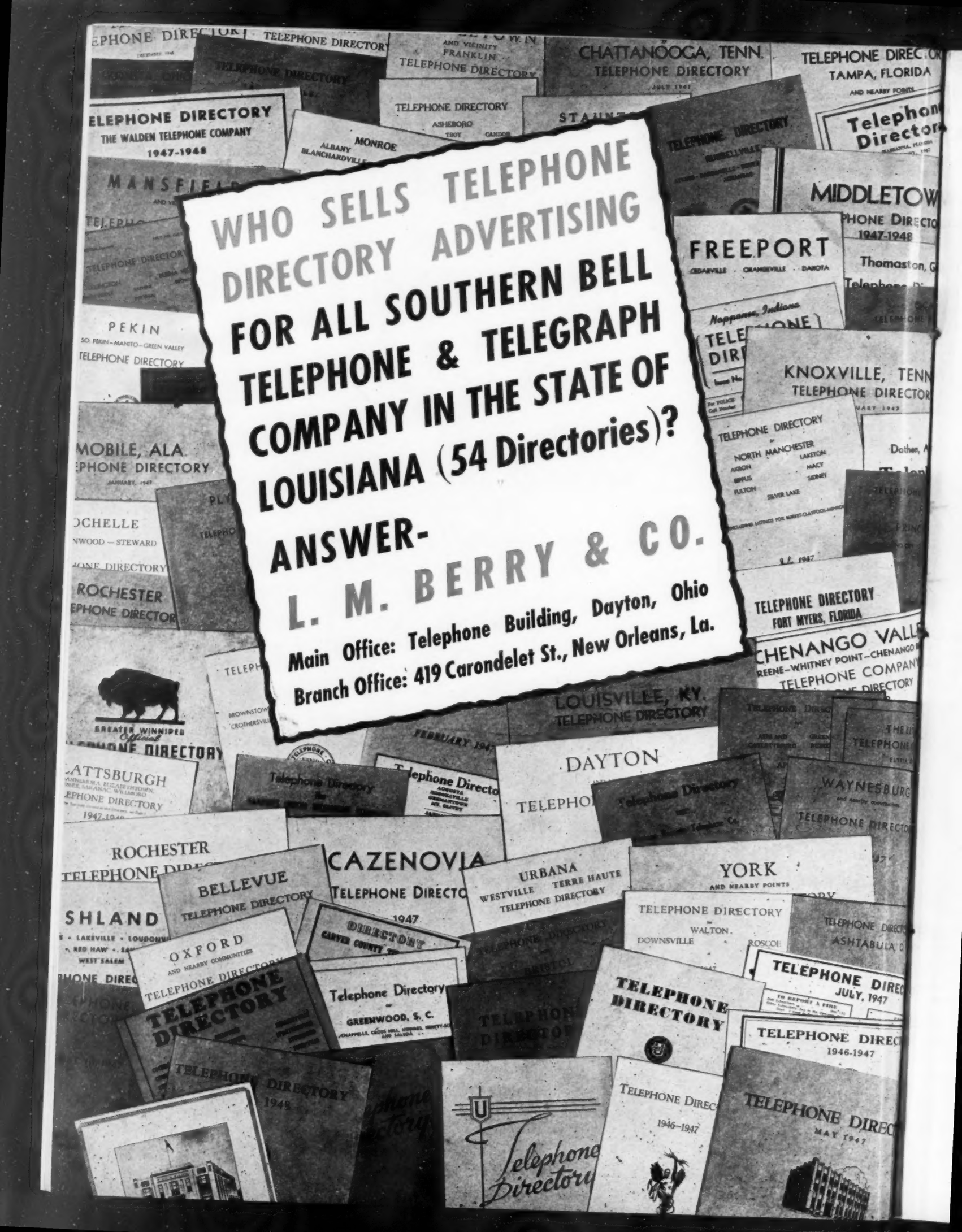
The International Automatic Electric Group offers also its technical skill and operating experience for the engineering, financing and installation of telephone plants of any size. Here, then, is a complete service which can be exactly adapted to your specific needs. We shall be glad to show how we can serve YOU.

International AUTOMATIC ELECTRIC Corporation

1027 West Van Buren Street, Chicago 7, U. S. A.

AUTOMATIC ELECTRIC SALES COMPANY, S. A.
22 Rue du Verger Antwerp, Belgium

Export Distributors For:
AUTOMATIC ELECTRIC COMPANY, Chicago, U. S. A.
PHILLIPS ELECTRICAL WORKS LIMITED, Brockville, Canada
AUTOMATIQUE ELECTRIQUE, S. A., Antwerp, Belgium
AUTELCO MEDITERRANEA, S. A. T. A. P., Milan, Italy
and other manufacturers
Selling Companies and Agents Throughout the World


WHO SELLS TELEPHONE DIRECTORY ADVERTISING FOR ALL SOUTHERN BELL TELEPHONE & TELEGRAPH COMPANY IN THE STATE OF LOUISIANA (54 Directories)?
ANSWER-
L. M. BERRY & CO.
Main Office: Telephone Building, Dayton, Ohio
Branch Office: 419 Carondelet St., New Orleans, La.

NEWSLETTER
TELEPHONE ENGINEER

Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND Management

ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH

NEWSLETTERS on Alternate Weeks

August 15, 1948

Dear Sir:

Telephone industry may feel effects of recent decision of Commerce Department's office of Industry Cooperation that manufacturers of military products will have to exhaust their own steel supplies before any extra steel is channeled to them under government's voluntary allocations program. This means that some manufacturers will be able to take military orders only if they are willing to cut production of civilian goods.

Mobilization experts have drafted proposed "Emergency Powers Act" ready to place before Congress if war should threaten. It is 25-section omnibus bill which would give government total power over men, industry and materials. Observers say resulting controls would dwarf those of World War II, both in speed with which they would be imposed and in their effect on every man and his business.

* * *

Emphasizing that expeditious action was made possible by adequate basic plant and operating records, California Public Utilities Commission has handed down order granting San Joaquin Associated Tel. Co. a rate increase 43 days after company filed its application.

San Joaquin company, operating three exchanges with 4300 stations, was granted rate increase of about $23,000, 90% of its request. Application was filed June 7, with first hearing June 21. Second hearing was held July 2, at which time commission staff submitted complete report, and order was handed down July 20.

* * *

Part of mystery of where public's dollars are going is cleared up by study of Natl. Industrial Conference Board that revealed taxpayers last year paid more in direct personal taxes than they spent for new homes, new cars, new furniture, charitable purposes, private education, and medical and dental expenses. Study shows that by end of 1948, individual taxpayers will have paid nearly $125,000,000,000 in direct personal taxes since the war began.

* * *

One of most significant discussions of present problem of the telephone industry of adequate rates to enable provision of good telephone service has been issued by Michigan Public Service Commissioner Schuyler L. Marshall, in statement while he was presiding at rate hearing of Moore Tel. Co.

Commissioner Marshall pointed out that "There comes a time when inflation catches up with any kind of business. The average commercial business can immediately pass the effect of higher prices on to its customer. The utility, because it is a regulated monopoly, must wait until its affairs are in bad shape before it can apply to this commission for rate relief. Then, immediately, the question arises as to whether or

not the rates—rate relief—can be given before improvement is made to the plant and the service. It gets back to that simple old question we have all heard about since we were children as to whether the egg came first or whether the hen came first."

* * *

Aug. 1 issue of Georgia Telephone Association Newsletter hits right at core of need of many companies for immediate rate adjustments. Letter states any alternative to revision of rate schedules to conform with the drastic changes in our economy is "purely wishful thinking"; comments that "upward revision of rates is always a messy business at best and no one enjoys it. The subscriber is no more enthusiastic over paying more for telephone service than you are over paying 85¢ for a 35¢ meal or $4.00 for a $1.75 shirt; but as long as you have to pay $1.00 for 30¢ worth of work your only out is to finish giving the business to the subscriber and close up. We use the word finish advisedly because many telephone managers have already given up to 90% of their business to the users."

Comments from Georgia indicate that in the final analysis, what the public wants first is more and better service; and that so far as rates are concerned "we are a long way from pricing the business out of the market. It is a paradox peculiar to our business that many are losing money and others going broke completely in the face of a seller's market. Famine in the midst of plenty."

* * *

Highlights: Munsing (Mich.) Tel. & Electric Co. installed new high frequency carrier system for handling toll calls; system enables company to have 2 extra toll lines without additional metallic circuits. . . . W. O. Heabler, dist. mgr., Northern Ohio Tel. Co., Willard, retired; served company over 46 years. . . . Mr. and Mrs. August Petzoldt now operate exchange of Chapman (Neb.) Tel. Assoc. . . . Harry C. McCluskey, exec. v.p. & treas. Kellogg Swbd. & Supply Co., elected national v.p. of National Ass'n. of Cost Accountants. . . .

Delhi (N.Y.) Tel. Co. completed installation of automatic equipment at Delancey, N. Y.; company plans to build lines to Bagley Brook, Terry Clove and Basin Clove. . . . Batesville Tel. Co. converted Milan, Ind. to automatic service. . . . Chas. A. Crane appointed area manager, Illinois Tel. Co., Jacksonville. . . . Jesse Tudor named mgr. Kempton (Ind.) Tel. Co. . . . United Tel. Co. cutover California, Mo., to common battery operation. . . . C. T. Mess appointed assistant director of Public Utilities, Calif. Public Utilities Commission, replaces Ray A. Wehle, resigned.

United Tel. Co. installed 4 new swbd. positions at Portland, Ind.; total cost $28,674. . . . P. J. Kaiser named mgr. Central Tel. Co., New Rockford, N. D. . . . Western Light & Tel. Co. cutover Oakland, Ia. exchange from magneto to common battery operation. . . . Wyoming Public Service Commission cancelled certificate of Red Bank Tel. Co., Tensleep, Wyo. . . . F. H. Simmons appointed area plant supv., Illinois Commercial Tel. Co., Belvidere. . . . Residents of Elrosa, Minn. voted to establish their own telephone exchange; town is now served through Belgrade & Paynesville.

Ray Smith

Ray W. Smith, Editor

As Simple as

1. *Simplified Design = Less Maintenance*
2. *Rugged Design = Longer Life*
3. *Experienced Engineering = Dependable Performance*

But added together they =

Reliable "RU" CABLE TERMINAL

1. **Simplified Wiring and Servicing result from the RU's flat fanning plate, jumper guide rings, molded face plate, and beveled washers.**

2. **Aluminum Alloy chamber outlasts the cable! Zinc cover is ribbed for extra strength.**

3. **Engineered for a standard in outside plant construction, the Reliable RU Terminal gives many years of steady, dependable service. Its wide acceptance throughout the industry proves its quality.**

BUILD FOR THE FUTURE—
Specify Reliable!

Reliable

ELECTRIC COMPANY
3145 CARROLL AVENUE, CHICAGO 12, ILLINOIS

OVER 40 YEARS *Service* TO THE TELEPHONE INDUSTRY

RUNZEL CORDS

FOR Every TYPE INSTRUMENT

Finest workmanship in the trimming operation.

—

Highest grade materials.

—

Constant and varied inspections during the process of manufacture.

—

these features assure a consistent quality cord in every detail and are responsible for the clarity of reception for which RUNZEL CORDS are popularly known.

RUNZEL QUICK SERVICE

We carry large stocks of cords for all types of telephone service. Whether you need one cord —a dozen—or a quantity, you'll get prompt service on your order. Emergency requirements are given special attention.

You can RELY on RUNZEL

RUNZEL
Cord and Wire Co.
4723 W. MONTROSE AVE.
CHICAGO 41, ILL.

Next Month

ALBERT W. KIMBER:—Nationally known security analyst starts the first of a series of articles interpreting present day financing problems. Mr. Kimber's address before the 1948 Executives' Conference of the United States Independent Telephone Association on "Financial Problems Of the Telephone Industry" was outstanding and due to many requests we published the address in the May, 1948 issue of FORTNIGHTLY TELEPHONE ENGINEER. Letters received from readers commending Mr. Kimber's article, resulted in our engaging him to write a series that we feel will be invaluable to the Independent industry.

• • •

B. C. BURDEN:—A top writer for the telephone trade press and nationally known telephone engineer, Mr. Burden will bring you a valuable article on "Your Wintertime Maintenance Program" covering modern procedures for putting lines and equipment in condition for troublefree operation. Route this valuable article to your construction and maintenance employees.

• • •

JOHN S. REED:—Following through on many requests for more information on the subject of "Overhauling Outside Plant In Connection With Dial Conversion Programs," Mr. Reed has prepared an illustrated article showing how to rebuild open wire leads, replace open wire or drop wire plant.

• • •

JOHN G. REYNOLDS:—Our managing editor—who by the way has had his safety articles published in several national magazines in the past few months—dug deep into his file of accident reports for background material for his article—"Safety-ize For Winter-Ice." This will be another you will want to pass along to all of your employees.

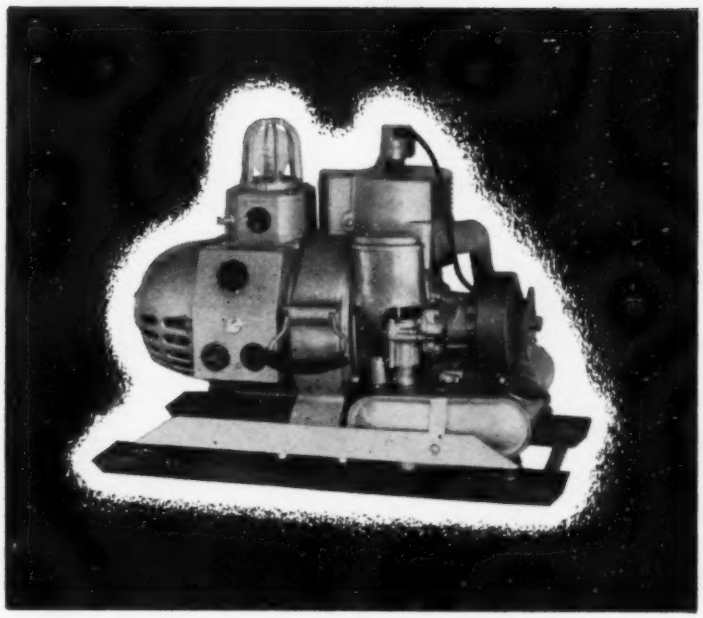
• • •

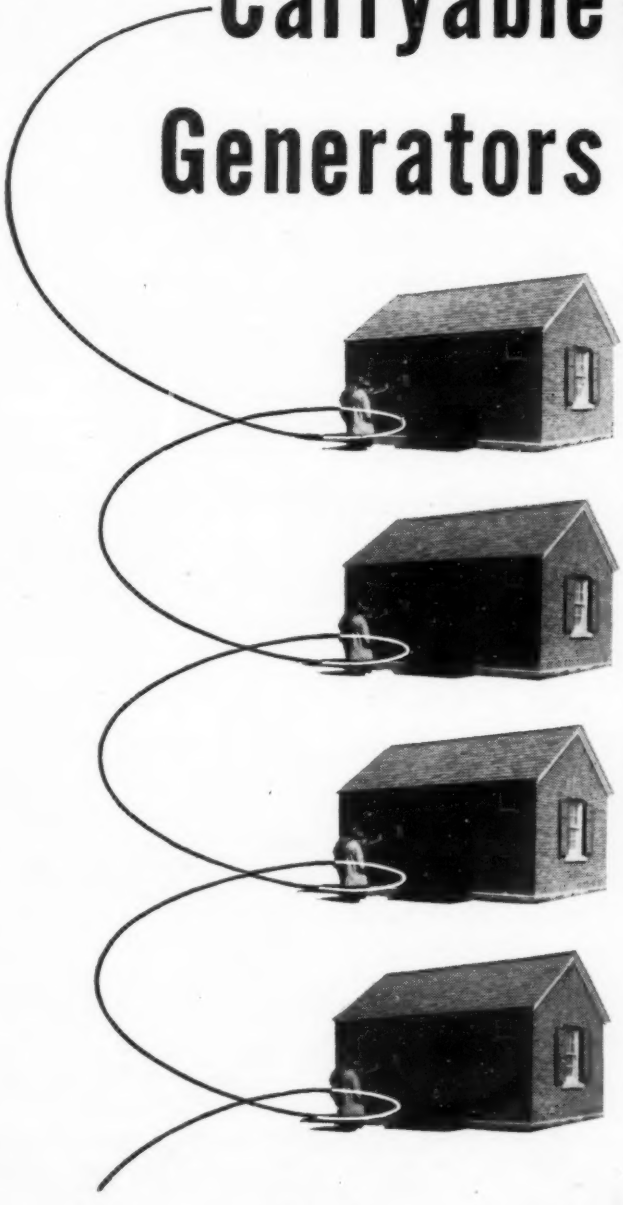
MYRLE SHAFER:—The author of our popular "How To Do It" feature has prepared several pages of his straight-to-the-point illustrated suggestions on construction and maintenance problems that we feel sure will land in many plant men's notebooks for reference. Many of our subscribers are clipping each issue of this feature and passing the suggestions on to men in the field.

• • •

. . . and, of course, all of our regular features will be on hand. There will be four full pages of the popular "Handbook For Telephone Men," . . ."Washington Bureau Reports," . . . "Line And Desk," . . . "New Products' Showcase," . . . "Free Literature Department," . . . "Tele-Quotes," . . . "Televiews," . . . "Telephone Engineer Newsletter," and the latest news from the field.

Have Portable Standby Power with Homelite Carryable Generators





When power goes out . . . rush a Homelite in.

There, in a nutshell, is your simple solution to serious emergencies.

Equipped with Homelite Gasoline-Engine-Driven Generators, you have an inexpensive standby power supply that can be whipped into action at all points of your system. Small and compact . . . light enough for one man to carry . . . a Homelite can be rushed by car or small truck to any of your central exchanges or relay stations. It will bring power *fast* to even the most remote locations.

Working closely for years with telephone companies, Homelite engineers have developed a complete line of carryable gasoline-engine-driven generators that will meet all standby power needs. Let a Homelite Field Representative survey your system and show you how economically and effectively you can be protected against power failure or shortages with Homelite *Portable* standby power. Write today.

Homelite

CORPORATION

1208 RIVERDALE AVENUE, PORT CHESTER, NEW YORK

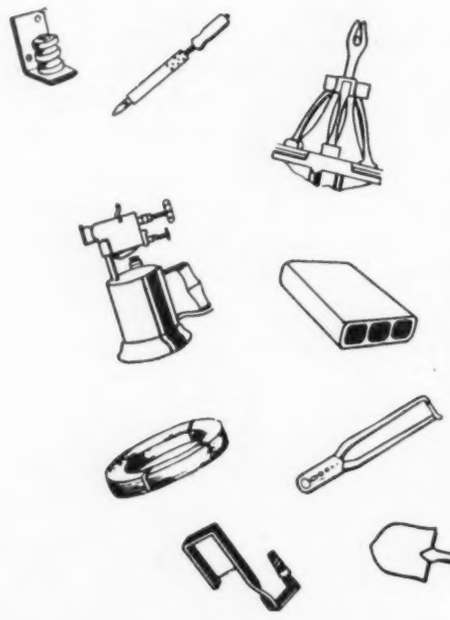
Manufacturers of Homelite Carryable Pumps Generators • Blowers • Chain Saws

How Late Will YOU Work tonight?

Here's a man in a muddle:

He needs fifty line-supply items — and he's trying to deal with almost as many individual companies. He MAY get home by eight tonight — but the job is *never* done!

Everything in Line Supplies at Your Finger-tips!



3 Simple Steps!

- **YOU FILL OUT JUST ONE FORM**
  for ALL your line supplies. Saves you time and work!
- **YOUR ORDER GETS PROMPT ATTENTION**
  from experienced telephone men. No chance for slip-ups here!
- **YOUR ORDER IS SHIPPED QUICKLY**
  from the distribution point nearest you. Fast, sure service!

KELLOGG Line Supplies

KELLOGG SWITCHBOARD & SUPPLY CO.
6650 S. Cicero Avenue, Chicago 38, Illinois

So he decides to clean house...

Someone tipped him off that he could order all fifty items from the same company! No need now for all those order forms, letters and time-wasting check-ups!

Now he's eating at home, again!

One short, quick order to KELLOGG and the job is done! And he knows everything will be taken care of *right* — because Kellogg GUARANTEES SATISFACTION!

Take your cue from this story with the happy ending and order your line supplies the simple, easy, time-saving way! One order form is all you need, for Kellogg stocks everything in line supplies—down to the last nut and bolt. And every item is of the finest quality obtainable!

You get your material faster, too! Kellogg's more than 100 distribution points all over the country allow quick shipment from the point nearest you. That saves you time and shipping costs.

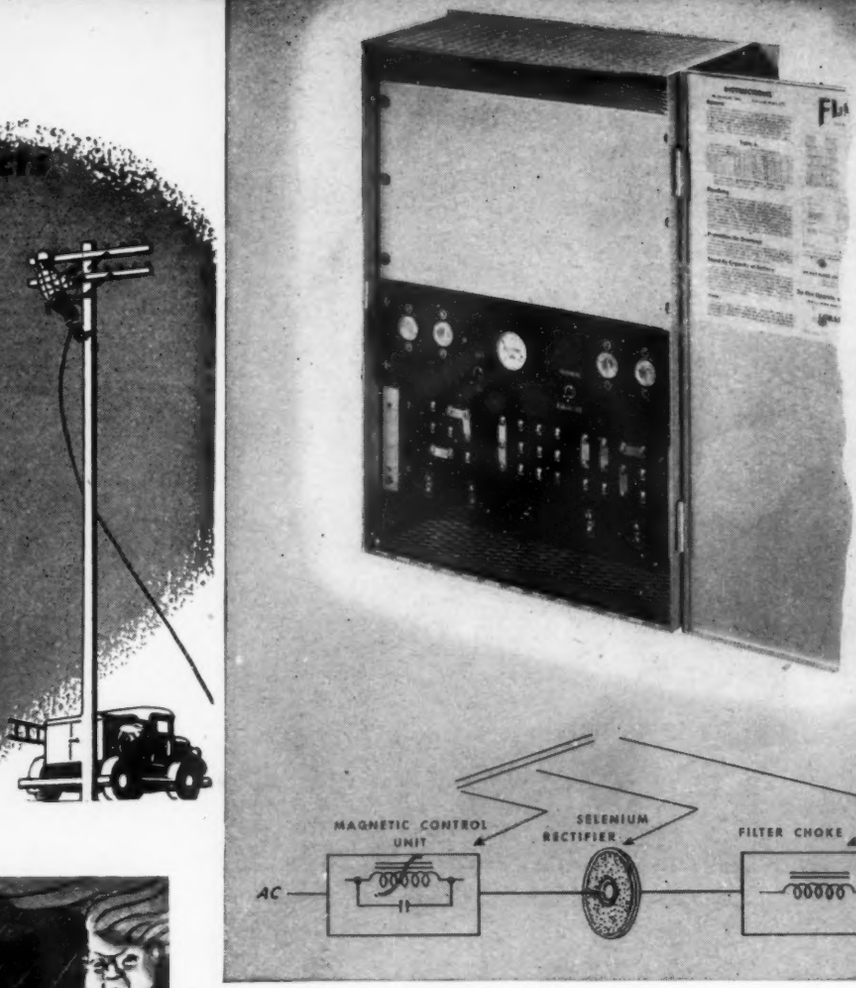
You know your order will be handled RIGHT at Kellogg, because from the moment it arrives, it's handled only by experienced telephone men. They understand your problems, and see to it that you get the materials that best suit your needs.

High quality in every item is assured, because every item is "DOUBLE-GUARANTEED." That means its quality is guaranteed both by Kellogg and by responsible manufacturers. And that same quality is what helps you hold down maintenance expenses.

For time-savings in ordering, faster shipments, and better quality materials—send your next order to Kellogg.

The Satisfaction Lasts When You Buy Products

Recommended and Guaranteed by KELLOGG

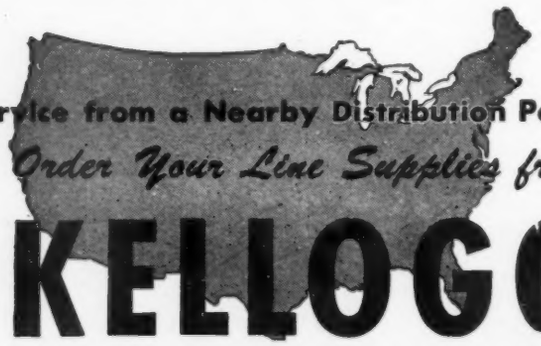


No Moving Parts to Wear! The Flotrol Battery Charger consists of a phase-splitting transformer and a dry-disc rectifier. Entirely automatic, it delivers correct trickle charge at constant voltage. Compensates for input voltage variations and load changes. Write LORAIN PRODUCTS CORP., Lorain, Ohio, for Bulletin No. 137.

Dependable—In Any Weather! Hemingray Insulators defy rain, snow, and sleet. They stand guard through the hottest summer days and the coldest winter nights. Made by AMERICAN STRUCTURAL PRODUCTS CO., many of these famous insulators are still in service after 20, 30—even 50 years. The insulator pictured above is Hemingray No. 9.

There's three-way satisfaction when you concentrate purchases of line supply and construction materials at a single, responsible source: (1) The *quality* is right—all products are backed by the famous Kellogg DOUBLE GUARANTEE; (2) The service is right—orders are intelligently handled by experienced people; (3) *Delivery* is right—orders are shipped from the nearest of over 100 strategically located distribution points.

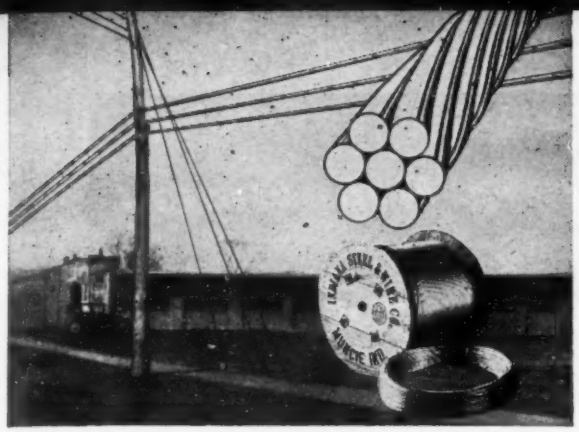
KELLOGG SWITCHBOARD & SUPPLY COMPANY
Branch Offices: Kansas City, San Francisco, St. Paul, Los Angeles
Factory and General Offices: 6650 S. Cicero Avenue, Chicago 38



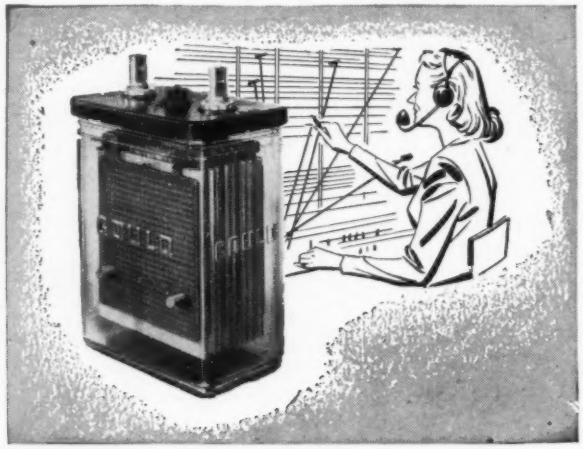
For Service from a Nearby Distribution Point

Order Your Line Supplies from

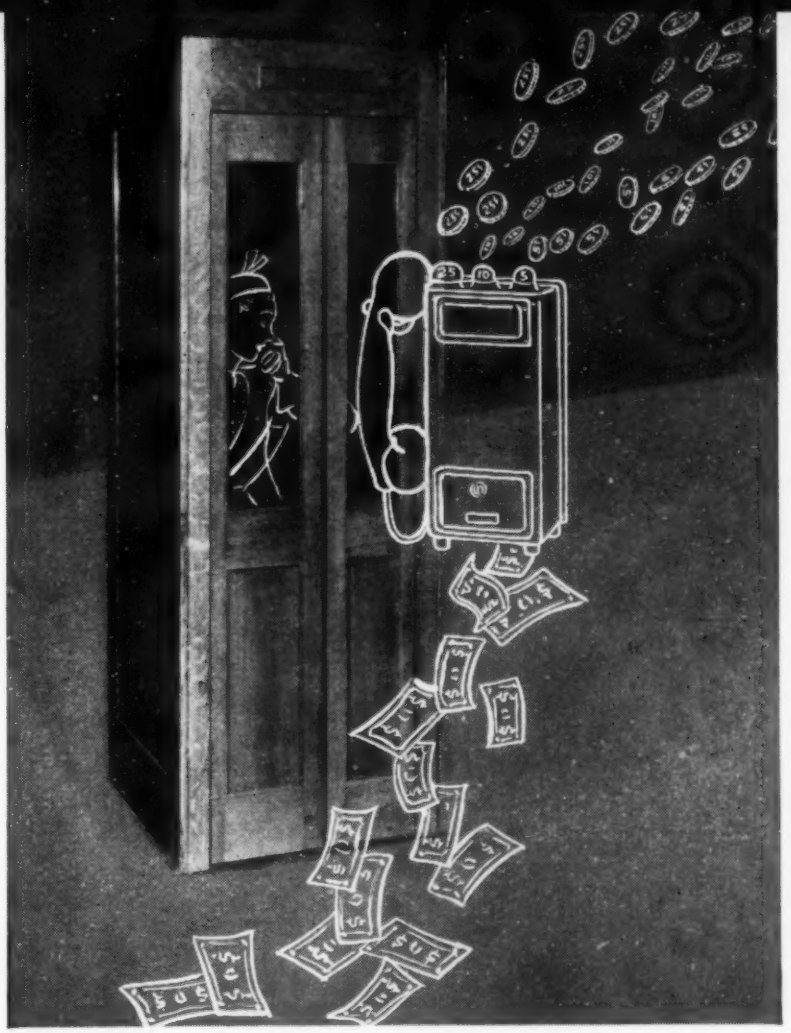
KELLOGG



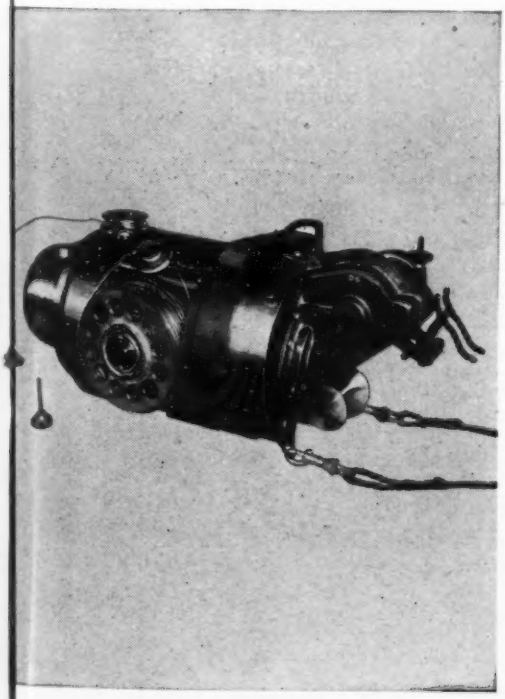
The Time-Tested Steel Strand! A heavy, ductile, tightly adherent zinc coating, applied by the famous Crapo Galvanizing Process, provides lasting protection from corrosion in Indiana Crapo Steel Strand. Made by the INDIANA STEEL & WIRE CO., its rugged strength minimizes maintenance.



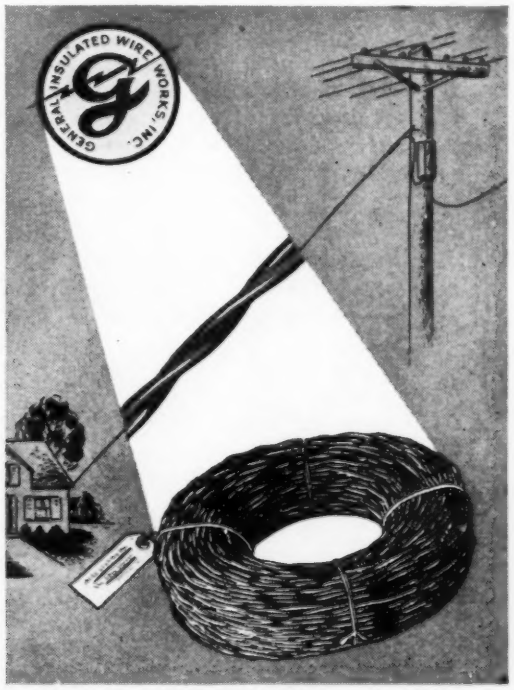
Dependable Power is the cost-cutting benefit enjoyed by users of GOULD STORAGE BATTERY CORP. Planté Batteries. The ribbed, pure lead positive plates are covered with a dense film of active material. This retards peroxidization even in full float service, insures longer life.



It Pays to Please! All over the country it's being proved that pay station revenues go up when you give the public what it wants—the privacy, roominess and comfort of modern telephone booths. Shown above is a popular business booster—CHURCHILL CABINET COMPANY'S No. 100 Booth, with automatic light switch and ventilator.

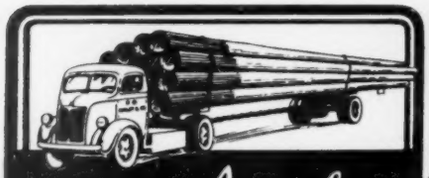


Lower Costs on New Construction! The Model "D" Neale Spinner, made by CABLE SPINNING EQUIPMENT CO., operates smoothly under all conditions. Ratchet locks it in position when pull on tow line is released, regardless of machine's location on strand.



Drop Wire Lasts 30% Longer! GENERAL INSULATED WIRE WORKS Bronze Drop Wire lasts longer because it's drawn of solid, noncorrosive bronze and covered with hard-wearing Neoprene insulation. It's a high conductivity wire that's flexible and easy to handle.

Sealed Against Trouble! Communication equipment manufacturers demand Kester Plastic Rosin-core Solder, because it makes a perfect seal. Prevents high-resistance joints and intermittent open-and-closed circuits. Avoid trouble with KESTER SOLDER COMPANY solder.



Haleys

CEDAR POLES
FIR CROSS ARMS

Quick
Truck Shipments
from our Ohio yard

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Also yards at
Minneapolis
and Haley, Idaho

R. G. HALEY & CO., Inc.
SPITZER BLDG.
TOLEDO 4, OHIO

Eliminating

GUESSWORK
in ENGINEERING
CONSTRUCTION
and MAINTENANCE
of Outside
Telephone
Plants

Plus . . .

NEW TOOLS
and PROPER
METHODS

are offered by

NEALE
CONSTRUCTION
COMPANY
TOPEKA, KANSAS

★ Free Literature Department ★

All literature described in this department may be obtained by sending in the handy blank at the bottom of this page.

Batteries: Storage battery users will be interested in the new 16-page, fully illustrated Brochure just published by Gould Storage Battery Corporation. The Brochure features: Raw materials specification and testing (The Spectograph and the Densitometer); Instantaneous Voltage measurement (The Oscillograph); Complex metallic compound analysis (X-Ray Diffraction Unit); Crystalline structure of cast lead (Metalloscope), and Proving products of research (Pilot plant). Request FL 212.

• • •

Floor Resurfacer: New six-page folder, issued by the Tufcrete Co., Des Moines 9, Iowa, describes uses of Tufcrete Resurfacer, indoors or out, on worn floors of wood, concrete, brick, asphalt, stone, etc., either for patching or a complete new surface. Also for sidewalks, especially over areaways in front of stores, for steps, expansion joints, tennis courts, concrete window sills, platforms, ramps, spalled columns and beams, reservoirs and tanks, swimming pools, etc. Request FL 213.

• • •

Magnetic Cores: "Trancors by Lenkurt" is the title of new 24-page folder issued by Lenkurt Electric Company. It describes the complete line of molded magnetic cores, core assemblies, coil assemblies, and filters manufactured by the company. These products, engineered specially to meet the exacting technical requirements of Lenkurt Carrier telephone and telegraph gear, have recently been made avaliable for industry. Request FL 214.

• • •

Marking Devices: New 8-page catalog describing and illustrating 18 different marking and code-dating machines has been issued by Adolph Gottscho, Inc. The machines, several of which are new models, are used for imprinting, indenting, embossing, etching and hot-stamping all kinds of containers, labels, parts and products, sheet rolls, etc. Most of them are automatic and designed to fit into conventional production-line operations, while all feature the use of quickly interchangeable type. Request FL 215.

• • •

Molded Products: "Keystone Precision Molded Products for the Electrical Industry" is the title of a folder published by Keystone Carbon Co. The literature describes Keystone powder metal parts and "Selflube" bearings, Keystone slip ring and commutator brushes, and Keystone negative temperature coefficient resistance units. Request FL 216.

• • •

Wire & Cable Catalog: A 48-page illustrated wire and cable catalog has been announced by the General Electric Company's appliance & merchandise department. In the new catalog are listed all the G-E thermoplastic, braided and leaded building wires, BX cable, entrance cable, Braid X and PVX cables, as well as the complete line of Flamenol, neoprene, rubber and braided cords and portables. Included, too, are Type C cord and the new shot-firing cords which have just been added to the Company's line.

In addition, valuable information on National Code requirements is given. Request FL 217.

Date .....

TELEPHONE ENGINEER PUBLISHING CORP.
7720 North Sheridan Road,
Chicago 26, Illinois.

Please forward the following literature described in the Free Literature Department of the August, 1948 issue of TELEPHONE ENGINEER AND MANAGEMENT: (Check information desired)

FL 212.....FL 213.....FL 214.....

FL 215.....FL 216.....FL 217.....

Name: ..... Title: .....

Company: .....

Street Address: .....

Town: .....Zone: .....State .....

THE BETTER THEY'RE SERVICED THE BETTER THEY RUN

AND THERE'S AN INTERNATIONAL TRUCK DEALER OR BRANCH NEAR YOU TO PUT 'EM IN TIP TOP SHAPE

You don't have to drive half across a state for International Truck Service.

International operates the nation's largest company-owned truck service organization—International Branches. In addition there are more than 4,000 International Truck Dealers with well-equipped, well-manned service stations.

International Truck service is prompt and economical. International mechanics are trained in factory methods and work with modern precision tools and instruments.

And you get factory-standard International Parts, just like the originals in International Trucks.

Every truck operator knows that an expertly maintained truck is an efficient truck. Get in touch with your International Dealer or Branch! Give your trucks International Service, because "The Better They're Serviced the Better They Run."

EXCHANGE UNITS AND UNIT REBUILDING

Here are two real money-savers: International Exchange Units are rebuilt so they are like new. Yet they cost much less. Exchange units are quickly installed. Costly lay-ups are avoided . . . Unit Rebuilding is done by the same factory methods. Consult your International Dealer or Branch now about the opportunities for you in International Exchange Units and International Unit Rebuilding.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
Chicago

Tune in James Melton on "Harvest of Stars." CBS Wednesday Evening

INTERNATIONAL TRUCKS

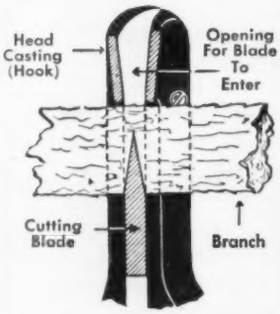
ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE, INDIANA

SEYMOUR SMITH
TELEPHONE TREE PRUNERS

Have Exclusive
CENTER CUT



Branch is supported on both sides of cut by heavy side pieces, between which a thin-cutting blade slices large, tough branches with ease and speed. No damage to cutting edge. Bark does not draw into cutting parts. They are designed throughout for line clearing use.

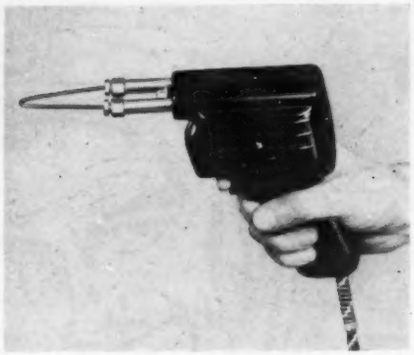
they CUT EASIER, FASTER, AND LAST LONGER!

Write for details on our full utility line.

SEYMOUR SMITH & SON, Inc.
901C Main St., Oakville, Conn.

New Products Showcase

For further information on New Products presented in this department, write New Products' Editor, Telephone Engineer Publishing Corp., 7720 N. Sheridan Road, Chicago 26, Ill. All inquiries will be answered promptly.



The Weller Manufacturing Co. has announced two new soldering gun models. These new models are designed for use on 110 or 220 volts at 50 or 60 cycles. The new 220 volt gun is advantageous for use wherever 115 volts—60 cycles is not available.

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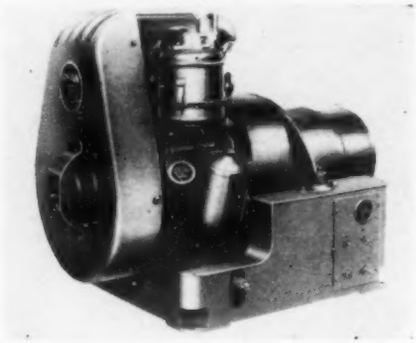

New Onan DSP air-cooled Diesel engine is the prime-mover for the Onan Model 205DSP (above), 2500 Watt Diesel Electric Plant. The Model 205DSP is economical to operate; approximately 0.136 gallon of fuel is required per kilowatt hour at full rated load. Electric cranking of the engine is made possible by a specially designed automatic compression release.

• • •

A light-weight, sturdy hand truck made by General Scientific Equipment Co. is designed to give maximum leverage on the handles and to carry the load on the wheels. The hand truck can be easily converted from one position to the other and is firmly secure in either position.

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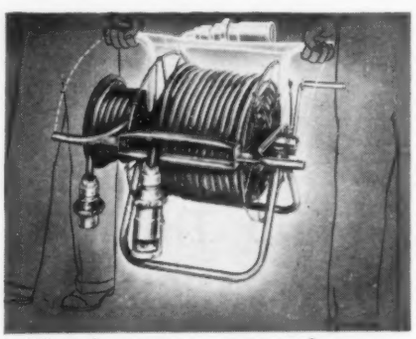

Electric power . . . any phase, any time, any place, is readily available with the use of this newly developed, portable Powereel. Capacity—300' of ¾ inch No. 12, four conductor cable or equivalent.

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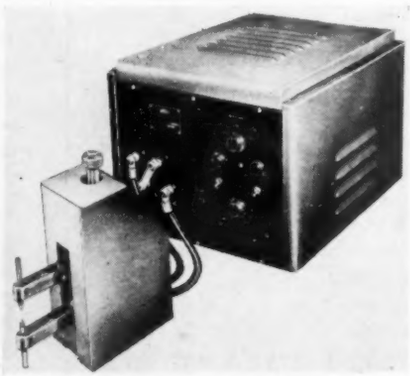
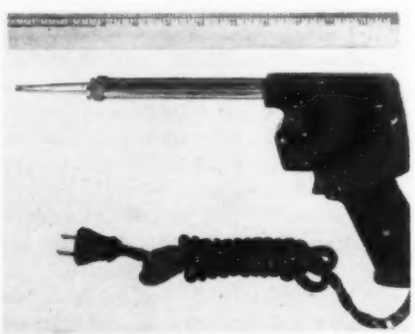


Raytheon Manufacturing Co.'s new model of the "Freshman 200 M.F.D. Condensor Weldpower" is designed for high speed precision welding of both ferrous and non-ferrous metals the unit is particularly applicable in industries which manufacture electrical parts, switches, radio parts and small fabricated metal parts.



Two "longer reach" soldering guns —8" and 12" units have been announced by Weller Mfg. Co., Easton, Pa. These two new models offer many advantages by providing easy access to spots otherwise difficult to reach. The 8-inch soldering gun is scientifically balanced and well suited for all normal soldering.

CALCULAGRAPH CALCULATES IT

...FASTER!
...ACCURATELY!
...AUTOMATICALLY!
...EASIER!

It's sound business practice in any exchange—small or large—to rely on CALCULAGRAPH to compute and record elapsed toll time accurately to the second. Thus, all the revenue due is charged to every toll call and operators are relieved of detail work that slows switchboard service. Available in several models and adaptable to any installation from flush mounting to portable pedestal types. Every CALCULAGRAPH features low initial cost . . . dependable service year after year. Complete catalog data on request.

CALCULAGRAPH COMPANY
SUSSEX STREET • HARRISON • NEW JERSEY

Build LINE SECURITY with CHANCE ANCHORS

All-Steel Screw Anchors are Double-Welded for GREATER STRENGTH!

For greater strength . . . easier installation . . . and increased holding power . . . the thin, fast-cutting blades on Chance No-Wrench Screw Anchors are separately forged, then *double-welded* to the rod. With the helix correctly and accurately pitched, tapered, and sharpened, these all-steel anchors bite into the ground with a minimum of effort and earth disturbance, and provide maximum strength and holding power. The forged steel Tripleye rod admits a bar for use as a "wrench", and the full-rounded eye gives protection against kinking for one, two, or three guy strands.

WRENCH TYPE SCREW ANCHOR

This all-steel anchor permits use of a smaller anchor rod since installation strain is applied directly to the hub of the anchor instead of the eye of the rod.

CHANCE SWAMP ANCHOR

Of cast, malleable iron, with sharpened cutting edges that bite through roots, this anchor is invaluable for installations in swamps, bogs, marshes or quicksand.

You KNOW you can rely on CHANCE

For greater line security — for proven anchor values — remember CHANCE, the world's largest anchor manufacturer—your *dependable* source for *dependable* anchors.

C4725

A·B·CHANCE CO · CENTRALIA MISSOURI

☆ *Advances in the Industry*

New Telephone Ideas

BY MYRLE SHAFER

SUBSTITUTE FOR QUARTZ . . . Artificial crystals, grown in the laboratory from ordinary chemicals, are starting to be used in the nation's expanding telephone network as a substitute for scarce but indispensable natural quartz.

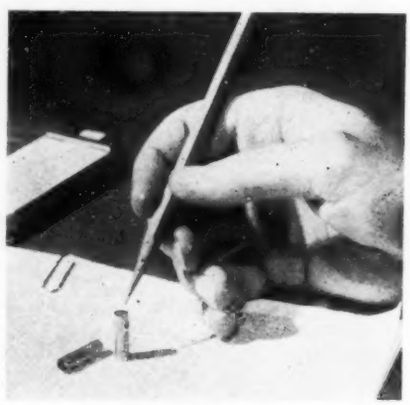
In a few years, the artificial crystals are expected to replace as much as 90 per cent of the natural quartz used in long-distance telephone systems—and do as good a job as its scarce, natural brother. Some New York to St. Louis circuits are already operating with synthetic crystal units. Additional urgently-needed long distance circuits are expected to go into operation appreciably earlier than otherwise possible as a result of development of the new crystal.

The new crystals, ethylene diamine tartrate, are familarly known as EDT. Although these crystals differ markedly from quartz in chemical composition, both are piezo-electric in character; that is, they can convert mechanical energy to electrical energy or they can reverse the process.

A small slice or plate, of such a crystal will vibrate with unvarying frequency when electric current is applied to it. Telephone engineers employ this characteristic of quartz—and now of EDT—in sending many telephone conversations over the same wires at the same time but at different frequencies, using crystal filters to guide each conversation into its proper channel. Thus quartz has been indispensable in the telephone system for many years.

* * *

THE TRANSITOR . . . An amazingly simple device, capable of performing efficiently nearly all the functions of an ordinary vacuum tube, recently was demonstrated for the first time at Bell Telephone Laboratories where it was invented. Known as the Transitor, the device works on an entirely new physical principle discovered by the Laboratories in the course of fundamental research into the electrical properties of solids. Although the device is still in the laboratory stage, Bell scientists and engineers expect it may have far-reaching significance in electronics and electrical communication.



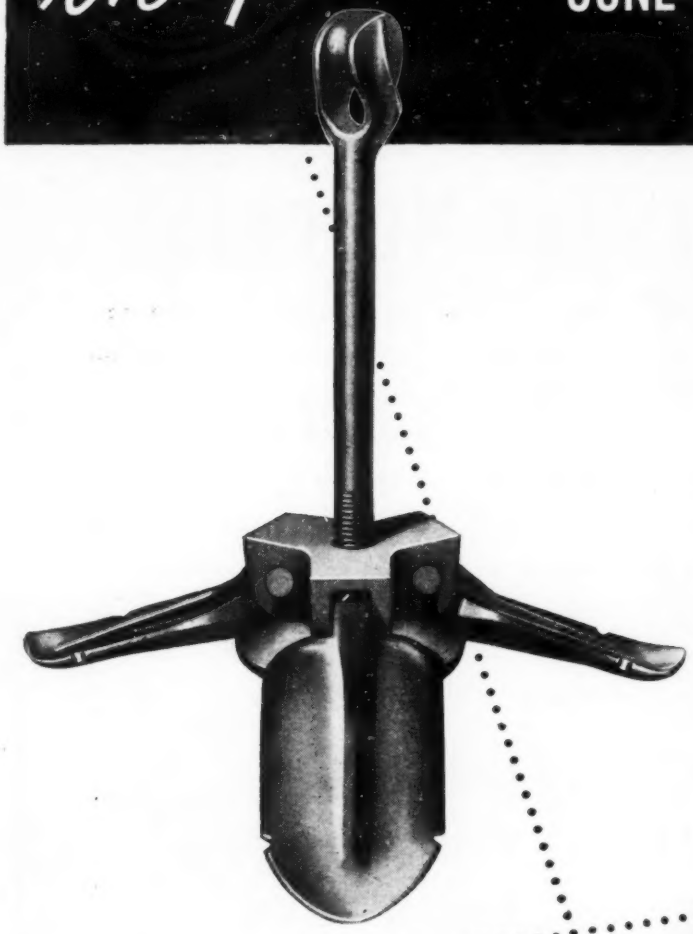
The whole apparatus is housed in a tiny cylinder less than an inch long. It will serve as an amplifier or an oscillator—yet it bears almost no resemblance to the vacuum tube now used to do these basic jobs. It has no vacuum, no glass envelope, no grid, no plate, no cathode and therefore no warm-up delay.

Two hair-thin wires touching a pinhead of a solid semi-conductive material soldered to a metal base, are the principal parts of the Transitor. These are enclosed in a simple, metal cylinder not much larger than a shoe-lace tip. More than a hundred of them can easily be held in the palm of the hand.

Tests have shown that the Transitor will amplify at least 100 times (20 decibels). Some test models have been operated as amplifiers at frequencies up to ten million cycles per second. Because of the basically simple structure of the new units, stability and long life are expected.

IMMEDIATE DELIVERY ON HIGH-STRENGTH MALLEABLE IRON* ANCHORS!

the New ALBION-DILLON CONE-SLANT, EXPANDING TYPE ANCHOR



There's no waiting for delivery—and no time wasted in installation when you use Albion-Dillon Malleable Anchors. These new, three-bladed, expanding type anchors are made with all the features you demand for long, reliable holding power.

Exceptionally long, cone-slanted blades dig neatly into solid earth to provide equally distributed holding strength. Because 80% of the anchor area is in the blades, a relatively small hole, compared to blade spread, is needed. This means, faster, more economical installation.

Tests have shown that the Albion-Dillon Anchor will withstand a 46,000 pound pull—your assurance that A-D Anchors will withstand the most severe service conditions.

Models in three hole sizes—3", 4" and 6"—are now in production, with two variations of blade spread available in the 6" size. Rods are not supplied.

Order from your distributor or write to us for full information, specifications and prices. There's no waiting for delivery!

ALBION-DILLON ANCHORS ARE INSTALLED QUICKLY, EASILY, AND SECURELY. A 3", 4" and 6" hole (depending on anchor size) is dug with auger to desired depth. A strand of light wire is placed around blades to hold them in place, The rod is attached and anchor is dropped to bottom of hole. A few blows with a spud or installing tool breaks the light wire and starts the blades expanding. The blades advance outward and upward to full length in the solid earth — quickly becoming locked into position and ready for service.

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Albion-Dillon Anchors are made with high-strength malleable iron, the ideal material for greatest economy and superior quality. Its high tensile strength, toughness and resistance to corrosion are important advantages that only malleable iron can offer—A-D Anchors have *lasting* strength.

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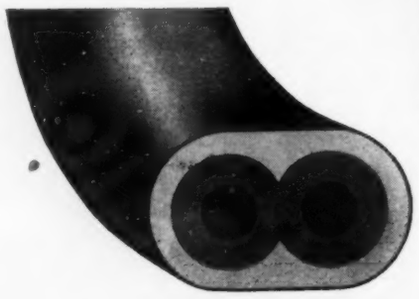

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Here's the drop wire you have asked for—the new Neoprene-jacketed NEOTEL, made exclusively for Automatic Electric by General Cable Corporation. NEOTEL is available now in twisted or parallel pair, in four different types, each with 17-gauge conductors. NEOTEL is impervious to oils and greases, has excellent abrasive and weather resistance qualities and exceeds insulation requirements by a wide margin of safety. Try Neoprene-jacketed NEOTEL the next time you order drop wire.

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MONOTYPE . . . Rubber-Insulated
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NEOTEL . . . Neoprene-Jacketed

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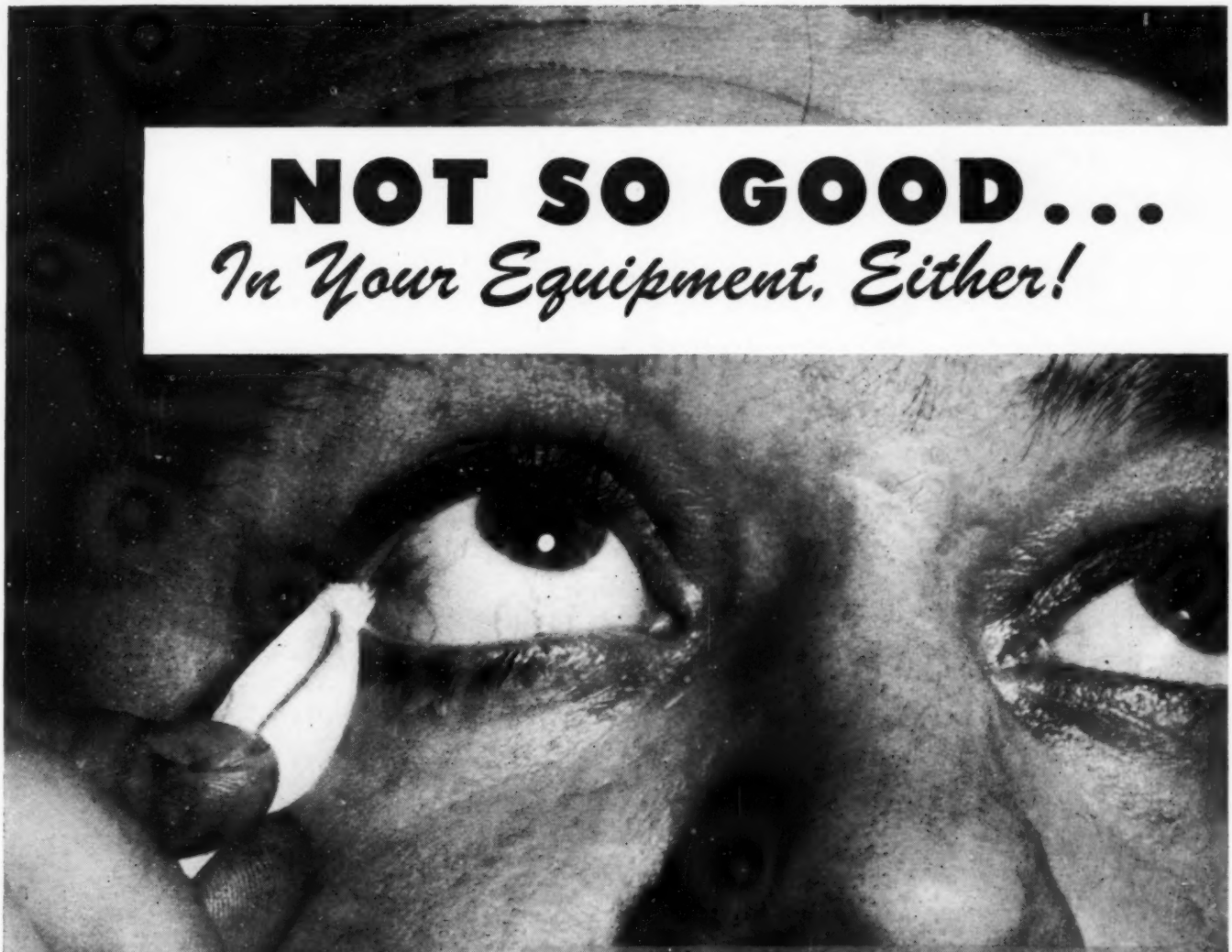

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Dust and dirt can be just as troublesome in delicate telephone equipment. But now there is a way to keep dust out of telephone exchanges . . . by removing it from the air *electronically*. Fine dirt, soot, smoke, oil mist, lint and other airborne particles as fine as 1/250,000th of an inch are effectively removed by Raytheon *Precipitators*.

Dust-free exchanges cost less to operate. Service standards rise and maintenance costs go down. So do cleaning and painting bills. And employees are healthier . . . and happier.

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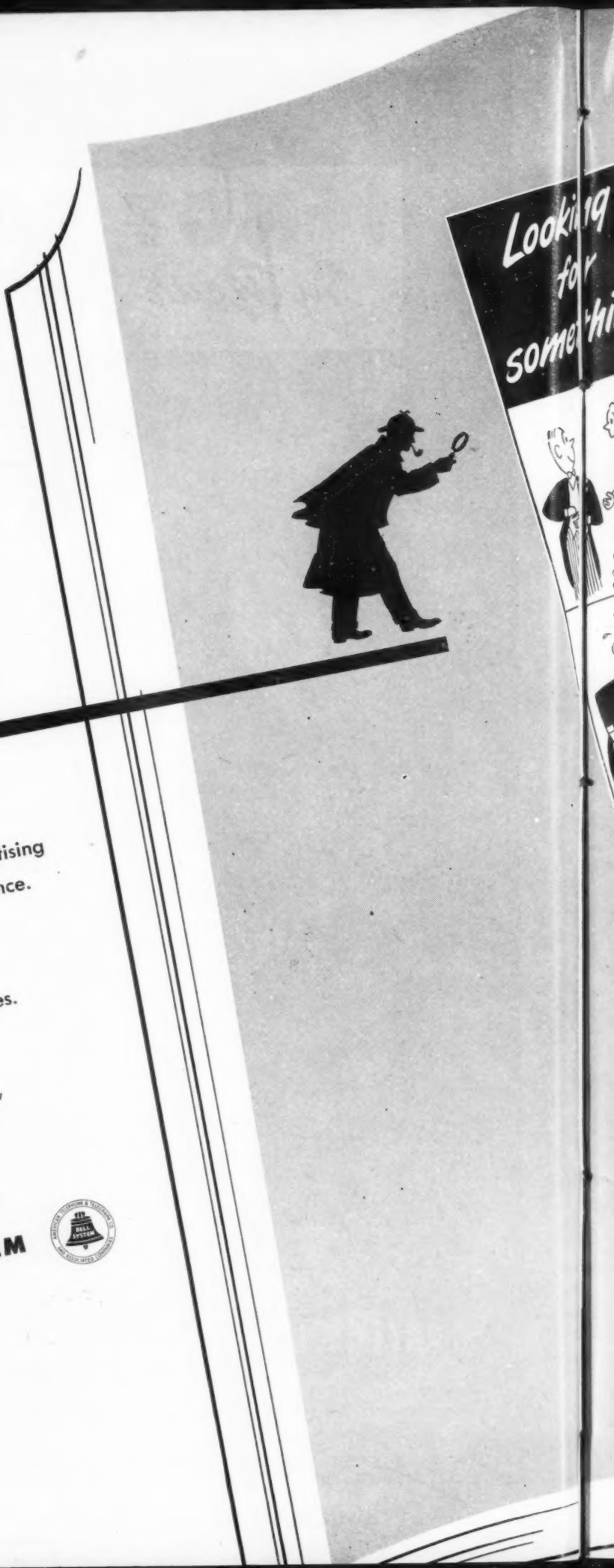

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• On the opposite page are three advertisements of a series currently appearing in national consumer magazines. They are designed to promote use of the "yellow pages" by the public. And that helps make the "yellow pages" worth more to local business men.

ADVERTISEMENTS OF THE BELL TELEPHONE SYSTEM

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Use the YELLOW PAGES of your Telephone Director
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Use the YELLOW PAGES of your Telephone Directory
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"EVEREADY" FLASHLIGHTS FOR INDUSTRY

ALL FOUR "Eveready" Industrial Flashlights are built to stand up under the day-to-day abuse of rugged industrial jobs. Equipped with silver-plated die-cast reflectors and prefocused lamps, these automatic spotlights deliver a clear, round spot of high intensity light.

FOR EFFICIENCY

in general industrial use, we recommend the Two-Cell Industrial Flashlight No. 1251 . . . or the more powerful Three-Cell model No. 1351. These "Eveready" brand flashlights are sheathed in a durable covering of rubber and chemigum, reinforced with heavy-gauge brass. This covering cushions shock and is resistant to water, oils, greases, gasoline, alcohols, and acids. The molded slide switch is easily taken apart and reassembled by hand. The ring recessed in the bottom cap is handy for carrying or hanging the flashlight.

FOR SAFETY

in explosive atmospheres, we recommend the Two-Cell Permissible Safety Flashlight No. 1259 . . . or the higher-powered Three-Cell model No. 1359. These lights are identical with the industrial flashlights described here, with the exception that they also have a spring-loaded contact within the reflector assembly . . . so that if the lamp should break in a dangerous atmosphere, this contact opens the circuit before the filament can ignite the explosive mixture. There is also a spare lamp carried in the bottom cap for quick changing on the job. Both "Eveready" Safety Flashlights are approved by the Bureau of Mines and the Underwriters' Laboratories for use in explosive atmospheres of: natural gas, lacquer solvents, acetone, alcohols, naphtha, gasoline, petroleum, propane, butane, benzine, and benzol.

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FOR BRIGHTER LIGHT, LONGER LIFE, USE "EVEREADY" FLASHLIGHT BATTERIES!

EDITORIAL

Money -- Money -- Money

THE North Carolina Utilities Commission recently said what is sometimes called "a mouthful", when approving an increase of exchange rates in its state for Southern Bell Telephone Company. The commission figured that the new rates it had approved for North Carolina would provide the company a 5½% rate of return on its operations in that state, but it was concerned over what might happen to the company's facilities for providing adequate telephone service in North Carolina if other state regulatory bodies having jurisdiction over the company's rates outside of North Carolina did not also allow the company adequate rates.

"This situation is giving this Commission grave concern," said the North Carolina commission, "because it is obvious to this Commission that a company in this plight is not in a position to get new money needed for its unprecedented expansion program by the sale of stock or bond issues. It is therefore apparent to this Commission that unless the several regulatory bodies, including this Commission, provide rates which will provide a fair profit to the company, the expansion program needed will be crippled or negated."

It seems to us that there are two important points involved in this statement of the North Carolina commission.

One is the fact which is—or should be—well known to all regulatory bodies and all managements of any kind of business, namely, that you cannot get people to invest in or lend money to businesses that cannot make a profit sufficiently large to pay dividends on the investment and interest on the loans.

There naturally follows the proposition that if you cannot get new money in the telephone business, that business cannot meet the very heavy demands now upon it for additional service, because no regulated business is ever allowed to make enough profit to carry on its expansion out of earnings alone.

But there is a second and also important point brought out by the North Carolina commission, which is that, when a telephone company operates in several states, all the regulatory bodies with jurisdiction over its rates must allow it adequate rates, or the result will likely be that its expansion will be hampered in all the states in which it operates.

This proposition of obtaining new money for the telephone business is not as easy, or as cheap, as it has been in the past, and it may become tougher in the future. And the public demand upon the telephone industry for additional service is greater now than it has ever been before. A tremendous amount of new capital is going to be necessary for the telephone business if this new demand is met.

Further, the amount of new capital must now be greater than ever before because the same number of dollars will not provide the same number of new telephones in operation, as has been the case in the past.

This new money proposition is already a real and in some cases a pressing problem for many telephone companies. It can be solved only if the telephone industry is allowed to make sufficient net profit to attract a large amount of new capital.

Many state regulatory commissions are now being bombarded by applicants for telephone service who want to know why they cannot have telephones. The quickest way these commissions can help supply telephone service to these people is to approve rates for telephone service that will allow the telephone company a sufficient rate of earnings to attract new capital.

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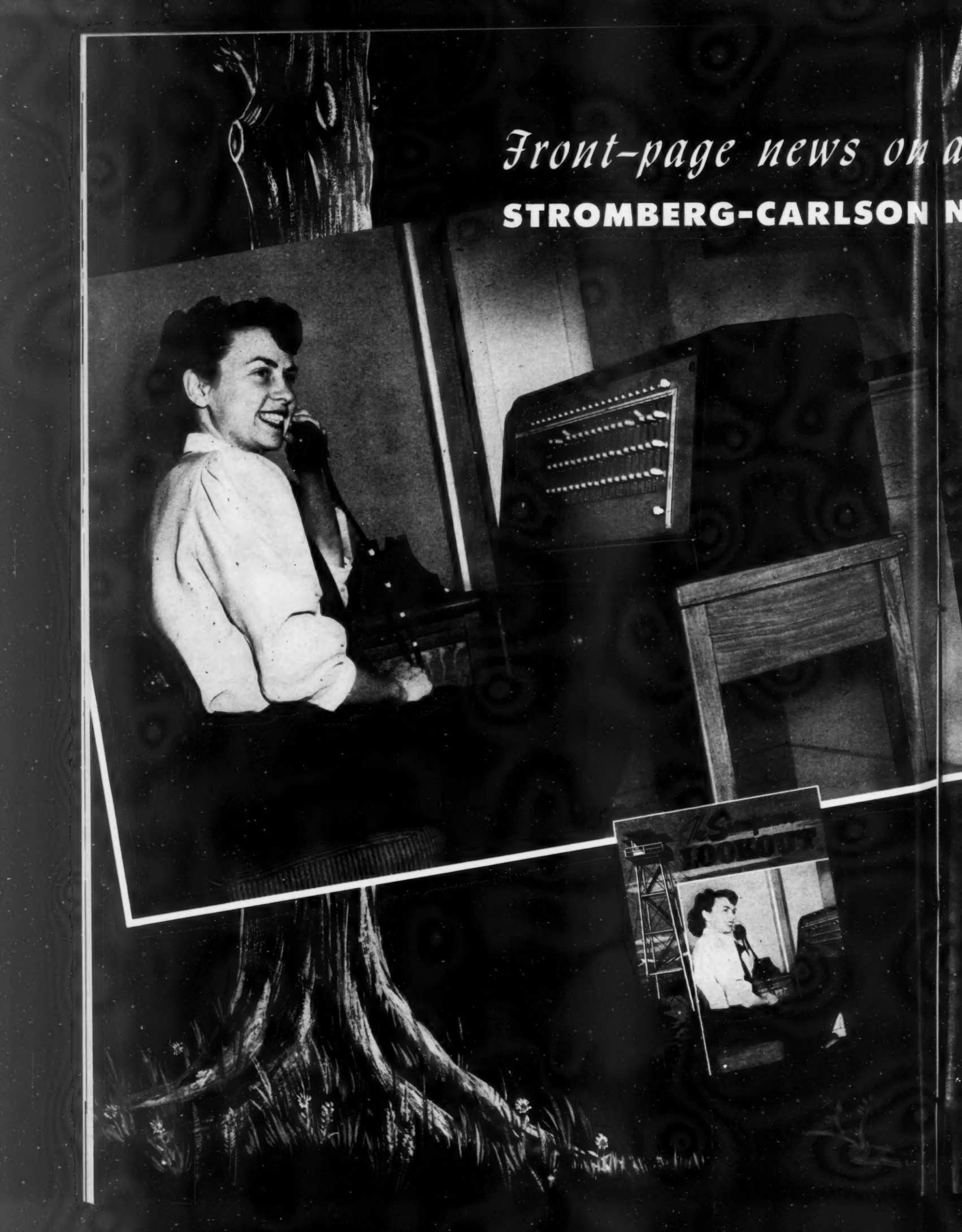
Front-page news on a
STROMBERG-CARLSON N
LOOKOUT

on a busy lumber company's magazine!

ON NO. 121 CORDLESS P.B.X. SWITCHBOARD

Out in McCleary, Washington, the Simpson Logging Company runs a highly successful lumber business — and faces the daily problems of telephone service which are common to any on-its-toes industry. Recently, the McCleary office installed a new Stromberg-Carlson 121 P. B. X. Switchboard and the editor of the company's house organ, Dave James, hailed the event with a front-page spread and these kind words:

"It's all New Look at McCleary's Simpson office switchboard, with Helen Colson decked out in the latest as she takes calls through her new flip-button exchange. McCleary's old switchboard was a plug-in relic of the other days when women wore 'laig-hiding' dresses and ostrich plumes. The new rig handles 15 lines and is ready to hook into the dial phone system soon to be established."

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Thank You Mr. James—

for your well-phrased compliment. Other companies like yours will be interested to know that our No. 121 P.B.X. boards are available for immediate delivery in either of two capacities: (1) with 12 lines, 3 trunks and 5 connecting circuits; (2) fully equipped and wired for 16 lines, 5 trunks and 5 connecting circuits.

Let SoundScriber record "The Voice *with a* Smile"

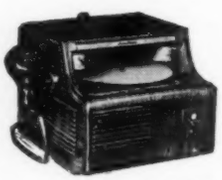
Telephone Companies are now installing Recorder Connector Units for the convenience of subscribers who wish to record their important telephone calls.

SoundScriber, by its capacity to record telephone conversations clearly, conveniently and *permanently* . . . is accelerating the use of this new business aid, *telephone recording;* is expediting telephone traffic wherever SoundScriber is standard equipment for business communications. With over 65,000 SoundScribers in use throughout the business day, SoundScriber itself becomes important telephone business.

Public stenographic services are now rendering a newer, quicker, *better* service by *recording dictation-by telephone* . . . using SoundScriber discs, transcribing their contents to letterheads in a matter of minutes.

Already SoundScriber is serving retail and wholesale establishments in Order Departments by *recording telephone orders* on SoundScriber discs. Because the disc recordings are permanent, and occupy no more space in a file than an ordinary letter, the original recording is *filed* as positive confirmation of what was ordered. No disputing what was said, for SoundScriber has recorded it. Furthermore, with SoundScriber DISCopying, duplicate voice-copies of telephone recordings may be made.

What better means of acquainting Telephone Company personnel with this increasingly useful and profitable business aid than to enlist SoundScriber for training "The Voice with a Smile" for Monitoring Service, for Telephone Business.



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CABLE FAULT LOCATION TECHNIQUES

By B. C. BURDEN

Second of a series of articles prepared for use as a refresher course for old timers and to acquaint newcomers with established practices. Part I appeared in the March issue.

The Visual Type Unit

THE VISUAL type of tone induction fault location method utilizes a much lower frequency than the audible method. Normally a tone of 16 2/3 cycles or 20 cycles per second from the ringing machine is used. The pickup coil is similar to that used with the audible method but has many more turns of wire and more iron to increase its effective coupling to the cable pairs which carry the tracer tone. The larger coil is necessary because the lower tracer frequency results in less effective electromagnetic coupling than at higher frequencies.

The pickup coil is connected to a two or three-stage high gain amplifier and rectifier which amplifies and then rectifies the low frequency current picked up by the exploring coil. The rectified d-c current is used to actuate a sensitive d-c microammeter. The reading on the microammeter is, of course, proportional to the magnitude of the a-c potential picked up by the coil.

The visual method is designed primarily for use in exceptionally long or loaded cables. The audible method, with its use of higher audio frequencies, is suitable only for what might be regarded as short exchange cables. When used on long cables or loaded cables, the tendency for the tone current is to carry beyond (carry-by) the point of the fault so that no difference in indication is obtained when the fault is passed. That is, the tone tends to spread out on long cables because of the capacitance between pairs or between pairs and cable sheath.

If the length of cable beyond the fault is short, the "capacitance bypass effect" is relatively small and the carry-by minimum. However, if a long length of cable exists beyond the point at which the fault occurs, the capacitance is high and the tone "carry-by" is substantial (see Fig. 10). By using a low frequency current such as that generated by a ringing machine, the amount of current which will flow through the capacitance in shunt with the fault is smaller than with the higher frequency current, hence, the carry-by effect is reduced. The use of a frequency as low as 20 or 16 2/3 cycles requires a different type of current indicator than a telephone receiver, as a frequency this low is hardly audible in a telephone receiver. Furthermore, considerable amplification must be used because of the poor electromagnetic coupling which exists at the lower frequencies. The amplifier with a detector and an indicating meter is used in a circuit similar to that shown in Fig. 11.

Spread of Tracer Current

THE VISUAL method of fault location is also useful on telephone cables, short or long, employing loading coils. Spreading of the tone in loaded cable results from coupling of the tone current between the phantom and side circuit loading coils. Tone current picked up on the good circuits flows beyond the fault in the good wires and acts the same as if a number of wires were connected in multiple. All of which results in a substantial carry-by tone. Earlier type visual

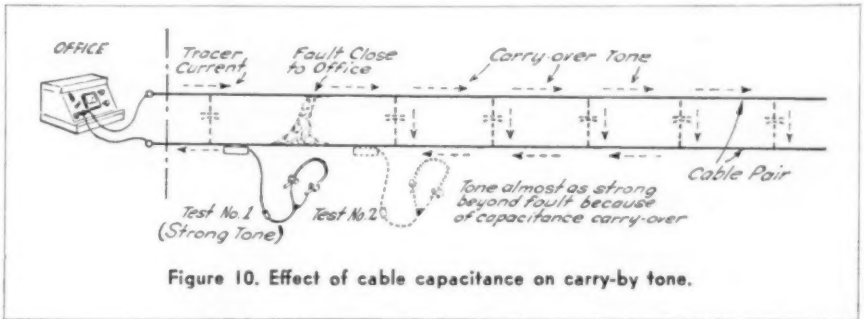


Figure 10. Effect of cable capacitance on carry-by tone.

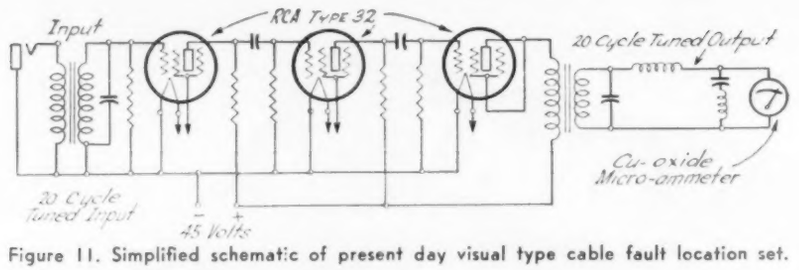


Figure 11. Simplified schematic of present day visual type cable fault location set.

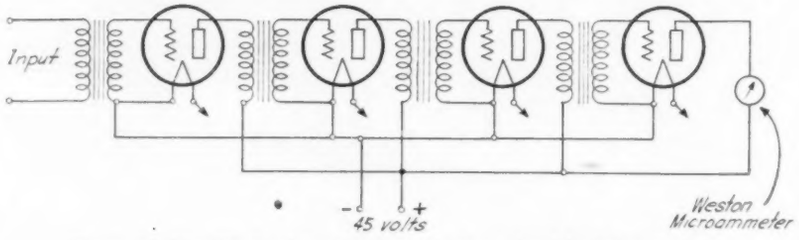


Figure 12. Simplified schematic of earlier type visual fault location set.

sets used by the Bell System make use of circuit similar to that shown in Fig. 12.

Interference from Tone Test Sets

THE VIBRATOR type tone generators can be and often are a source of interference to working pairs in cables to which the tone generator is connected. This is particularly true when the tone generator is connected between a faulty wire and ground as this results in an unbalanced circuit and maximum crosstalk. Large operating companies usually require the use of special "wave improvement filter" (see Fig. 13)

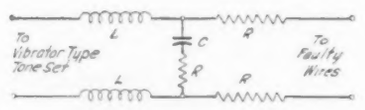


Figure 13. W. E. wave improvement filter used with 20-CWE sets.

which serves to reduce the power level of the generator, and which also attenuates the higher frequencies which might interfere with carrier systems operating through cable to which tracer current is applied.

Testing procedures should be set up which will insure that important cables which carry broadcast circuits or carrier channels can be given special treatment in the event a fault location test must be made on them with a tone set.

Most vibrator type tone generators are equipped with high and low impedance output terminals. The high impedance terminals should be used when the fault resistance is high and the low impedance terminals when the fault resistance is low. When the tone method is used the tone generator should be connected to the faulty pair at whatever point will result in minimum length of cable beyond the fault for this reduces the amount of "carry-by".

Types of Exploring Coils

SOME EXPLORING coils are made so as to be neutral to sheath currents. Sheath current result in the case of grounded type faults, when the tracer current source is connected to faulty wire and sheath. This causes the tracer current to pass out over the faulty wire and to return along the sheath back to the source and also via grounds beyond the fault. That is, tracer current flows in both directions from the fault as cable plant is normally grounded all along its length.

Exploring coils are made neutral to sheath currents by arranging the two coils so they are in a symmetrical field with respect to the current which flows in the sheath and thus have equal and opposite voltages developed in the two halves of the coil, but at the same time they are not symmetrial with respect to the electro-magnetic field surrounding the wire on which tracer current flows.

This same coil is useful for locating crosses but not shorts. It will work on crosses and give good audible indication when the wires are in such position that each of the crossed wires is under a pole piece.

Another type of coil that has been used for many years has two sets of connections, one for shorts and one for grounds. The basic construction of this coil is shown in Fig. 14.

It consists of a "U" shaped iron core and the receiver is connected to the common wire and "G" terminal for grounds, and the common terminal and the "S" terminal for shorts. When the receiver is connected to the ground side the two half windings are connected differentially, that is, if cut by equal flux, zero voltage would be developed across the receiver.

The spacing between the two pole pieces is such as to take advantage of the normal twist or rotation which the pairs have. Sheath currents create equal flux in the two windings whereas the current in the faulty pair, because of the one winding of the coil being better coupled to the faulty pair than the other, give unequal response and the differential tone voltage will be heard in the receiver.

When the receiver is connected to the common and "S" terminal for locating shorts it will be seen the two windings are additionally connected. In locating shorts the coil is held at right angles rather than parallel with the cable. This results in maximum coupling between the two wires of a pair. Normally the exploring coil should be held at the bottom of the cable so as to keep it as far away from the messenger strand as possible. Fig. 15 shows the correct use of this coil.

Location of Split Pairs

IN THE USE of a exploring coil, particularly in the location of shorts, it will be observed the tone

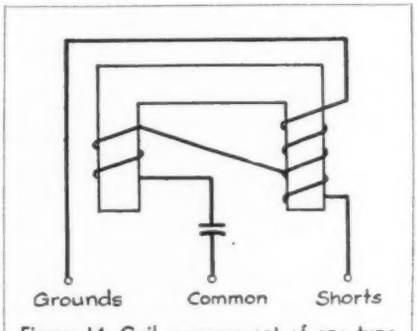


Figure 14. Coil arrangement of one type of pickup coil.

will be alternately strong and weak ("picket fence" effect) as the pick-up coil is moved along the cable. This results from the opposite fields of the two wires of the pair which carry the tone current tending to neutralize each other at crossover points. That is, where both effect each of the two windings of the coil in about equal

amounts. This effect is shown in Fig. 16.

The effect can be utilized in the location of *split pairs* by shorting the four wires of the two split pairs at some distant point, preferably as close to the point at which the split is known to occur as possible. The tone set is connected to one of the split pairs. The picket fence effect will be noted on one side of the point at which the split occurs but not on the opposite side. In other words, after the point at which the split occurs is passed the points of neutral induction are not encountered. Hence a steady tone is heard on the far side of the split.

Split quads can also be located by this method by shorting each pair of the two split quads in the manner shown in Fig. 17.

Use of Amplifier With Exploring Coil

VACUUM tube amplifiers can be used to advantage with inductive tone pickup coils. The amplifier is particularly useful in amplifying the feeble tone voltages picked up by the exploring coil when dealing with high resistance faults and with shorts. An amplifier will not be of material help if the carry-by tone is almost as substantial as the returning tone. However, for most tests they contribute substantially to the efficiency of the inductive type fault location method.

Several styles of amplifiers are available. One type consists of two stages of tetrode and one triode stage of amplification. A popular type amplifier, which has recently been placed on the market by the Leco Engineering Company of Lincoln, Nebraska, is pocket size and uses the latest miniature tubes and Minimax hearing aid type batteries. The new unit (see Fig. 18) weighs less than 2 pounds and can be carried in the pocket, yet is capable of amplifying the voltage picked up over 20,000 times.

Fig. 19 shows a simplified circuit of the pocket amplifier. It makes use of newly developed car plug type head receivers which cut out extraneous noises, hence, make it easier to detect changes in tone level. A sensitivity control permits the output level to be adjusted to the point where it is just audible. This enables changes in volume of the tracer current to be more easily detected than when the amplifier is operated at full gain at all times—*To be continued in the September issue of TELEPHONE ENGINEER AND MANAGEMENT. For Part 1 of this series, please refer to page 32 of the March, 1948, issue of TELEPHONE ENGINEER AND MANAGEMENT.*

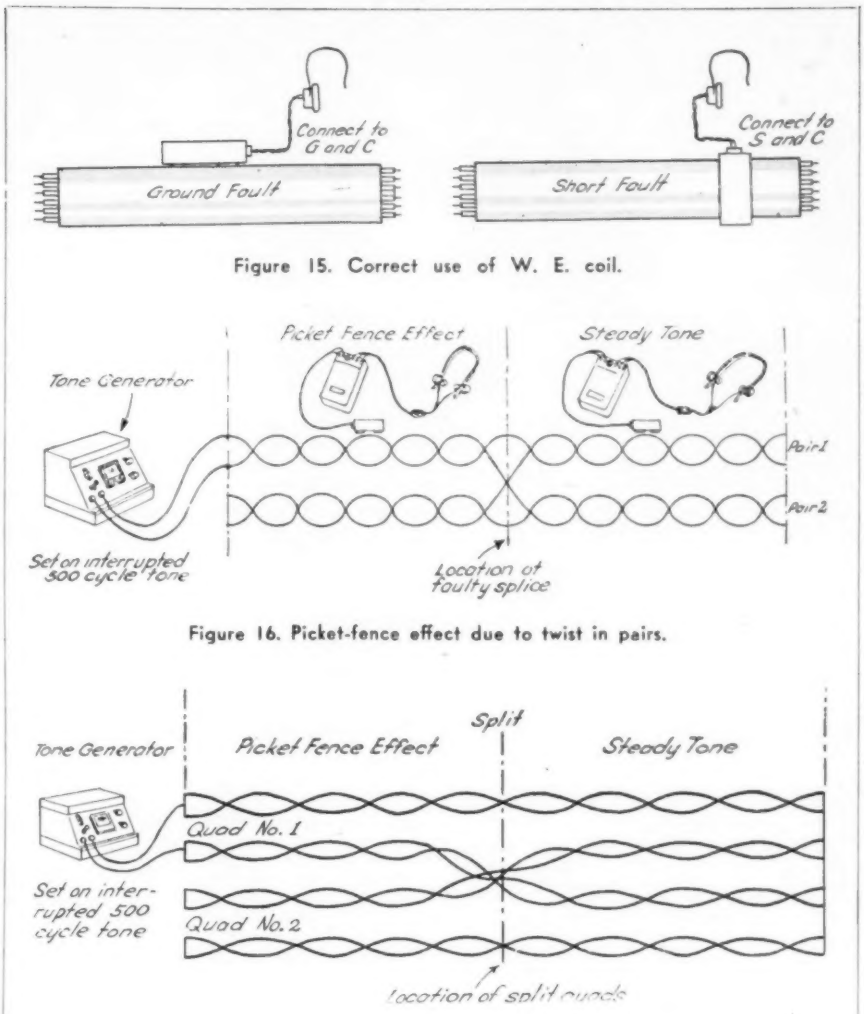


Figure 15. Correct use of W. E. coil.

Figure 16. Picket-fence effect due to twist in pairs.

Figure 17. Location of split quads by means of 'picket-fence' effect.

Figure 18. Leco Pocket Amplifier. (Courtesy of Leco Engineering Co., Lincoln, Neb.)

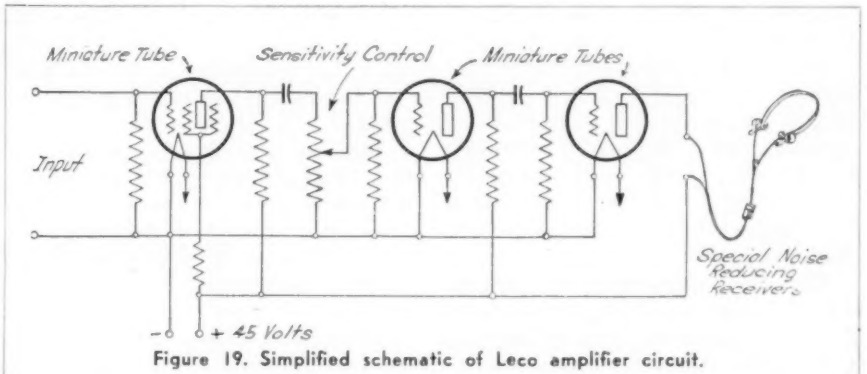
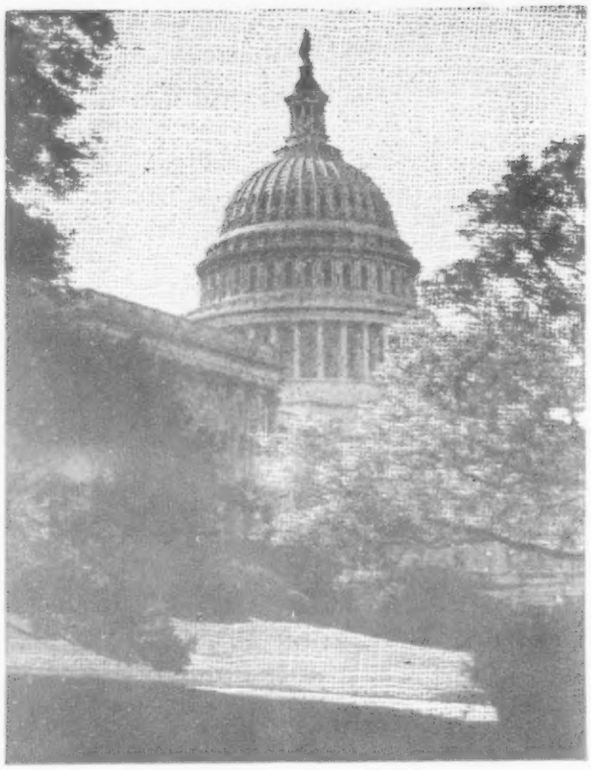


Figure 19. Simplified schematic of Leco amplifier circuit.



WASHINGTON

Bureau

REPORTS

BY ROLAND DAVIES and FRED HENCK

Rate Decisions

A BODY OF extremely significant decisions recognizing the need of telephone companies for adequate rates to meet the cost situation as it exists—not as a regulatory agency thinks it should exist, or will exist at a later date—is being built up through the unbroken string of judicial verdicts upholding the appeals of Bell System companies to certain state commission findings.

The decisions have been as significant to the telephone industry as the Two Rivers, Wisc., verdict, well known to all Independents.

The most recent state commission reversals came by state supreme courts in Georgia and Oklahoma, while in Kansas a district judge has ordered the Corporation Commission to hear evidence which it earlier had rejected.

Georgia's Supreme Court issued a landmark decision, pointed out by the National Association of Railroad and Utilities Commissioners as "the first comprehensive state supreme court decision in the current series of Bell System rate cases", which upheld the Southern Bell Telephone & Telegraph Co. almost en toto in its appeal to a commission decision granting slightly less than 40% of the company's proposal.

The court supported its findings with a number of precedent court decisions which went far to clear up the muddy thinking which has resulted in some state rate cases of disallowance of actual expenses by percentage formulas taken from prewar operations or from "predictions of things to come."

Among the quotations taken from U. S. Supreme Court utility case decisions were that prophecy is "generally a poor substitute for experience" and "estimates for tomorrow cannot ignore prices of today." Another was that "elaborate calculations which are at war with realities are of no avail" and that "present confiscation is not atoned for by merely holding out the hope of a better life to come." The Georgia Supreme Court emphasized that the commission's rejection of actual expense items "constitutes no legal excuse for justification to prophesy that the confiscation would decrease as the years go by." It said expenses are properly allowable in rate-making in their exact amount.

Another Supreme Court quotation was that "in the absence of a showing of inefficiency or improvidence, a court will not substitute its judgment for theirs (the managers of a business) as to the measure of a prudent outlay."

The Georgia court had pointed out that "the commissioners are not the managers of the company, but their function is to regulate and disapprove any dishonest or clearly inefficient conduct and practice by the company."

The state's highest tribunal later rejected a commission request for reconsideration of the verdict. The finding's importance was recognized by Georgia Public Service Commission Chairman Walter R. McDonald, who said that he feels the commission was "absolutely right," but that the court decision will be "far-reaching in future utility rate regulation."

In a decision which upheld the principle of collection of temporary rate increases under refunding bond while permanent rates are being considered, thus protecting both the company and the telephone subscribers, the Oklahoma Supreme Court upheld the appeal of the Southwestern Bell Telephone Co. and ordered the state's Corporation Comission to permit the company to collect its proposed rate schedule under the bond arrangement.

Also in the Southwest, the Kansas Corporation Commission has been ordered to hear and receive evidence from Southwestern Bell on the cost to the American Telephone & Telegraph Co. and the Western Electric Co. of services and commodities furnished the Southwestern company. The commission dismissed the company's rate petition on the grounds that Southwestern Bell had not complied with the state's "affiliation" statute, requiring what the commission interpreted as detailed proof that equipment prices of Western Electric are reasonable, down to every last item. The commission then rejected a request for rehearing.

Judge Heinz said the rehearing request had given the commission the opportunity to explore the facts by

hearing the evidence which the company offered to produce. He declared he considered the testimony relevant and material, that it should be received in order to complete the record, and that it should prove quite helpful in reaching a proper decision in the case. Southwestern Bell, which had produced evidence showing the general reasonableness of Western Electric prices and profits, said when the petition was dismissed that "strict compliance with (the affiliation law) would require the company to prove, for example, that each individual pole or insulator purchased from Western Electric and placed in service, even 25 years ago, met the requirements of the statute."

Southern Bell has been upheld in a number of states in addition to Georgia. In Mississippi, for example, a jurist in granting the company a temporary injunction to collect its rates under bond—the injunction later was made permanent by the same court—emphasized that "Our duty is to determine whether the claims of this petitioner are true or false, fair or unfair, honest or dishonest, and the obligation of government is to give relief if the business requires it . . . " He asked "When for a single day would the people consent to dispose of their telephone communication or have its physical structure crippled into inadequacy for lack of a moderate increase in rates?"

An Alabama judge completely upheld Southern Bell on the basic principle of interim increases under bond —that the company is protected against continuing losses if the rates later are increased, and that meanwhile users are safeguarded if rates lower than those sought by the company are ultimately approved.

A Tennessee jurist also completely supported Southern Bell in the rate proceeding in that state, now being considered by a court of appeals. The Tennessee commission, the first to reject entirely a Bell company rate boost request after full hearings, also was the first to reduce arbitrarily the actual expenses for rate-making purposes by use of a percentage formula method. The judge disposed of this approach with the point that "the company has no way of hurdling the present and it is required to operate under the conditions as now exist."

What can happen in state regulation—although, fortunately, it has happened only once—is illustrated in Rhode Island in the "case of the disappearing hearing board." There the rate increase request of the New England Telephone & Telegraph Co. became a political football, with the Administrator finally handing down a decision granting the company less than half its proposal nearly a year after the application was filed.

The company took the case to the state's three-member public utility hearing board, which after a delay of nearly four months finally began "hearings". It developed at that time that one member of the board held 70 or 80 shares of A. T. & T. stock. After a recess, the chairman announced that while he held no Bell System securities personally, he administers some trusts which include Bell System stock and debentures. Furthermore, he said, if any objection were raised to the board member, he (the chairman) would consider himself in the same light.

Naturally, the state's attorney objected, whereupon both the chairman and the board member resigned, and the board virtually vanished into thin air. At present the board still exists legally, although it has no quorum.

Coming Conventions

Rocky Mountain Telephone Association, Albany Hotel, Denver, September 16-17.

Michigan Independent Telephone Association, Hotel Olds, Lansing, September 23-24.

United States Independent Telephone Association, Stevens Hotel, Chicago, October 11, 12, 13.

South Dakota Telephone Association, Cataract Hotel, Sioux Falls, October 20-21.

The North Carolina Independent Telephone Association, Grove Park Inn, Asheville, October 25 and 26.

South Carolina Independent Telephone Association, Wade Hampton Hotel, Columbia, November 1-2.

Florida Telephone Association, Orange Blossom Hotel, Sarasota, November 8-9.

Virginia Independent Telephone Association, Roanoke Hotel, Roanoke, November 11-12.

Missouri Telephone Association, Governor Hotel, Jefferson City, November 15-16.

Alabama Independent Telephone Association, Jefferson Davis Hotel, Montgomery, November 18-19.

Recorder Issues Finally Settled

FOR THE TIME being at least, all the issues in the long-standing telephone recorder case appear to be settled, and the nation's telephone companies are making the service available under the regulations of the FCC and the state commissions.

What is hoped will be final action came when the FCC rejected the petition of the Dictaphone Corp., recorder manufacturer which waged a long battle against, first, a tone warning signal, and second, the tariff proposals of the telephone companies for furnishing the unit to connect the recorder and to sound the warning "beep".

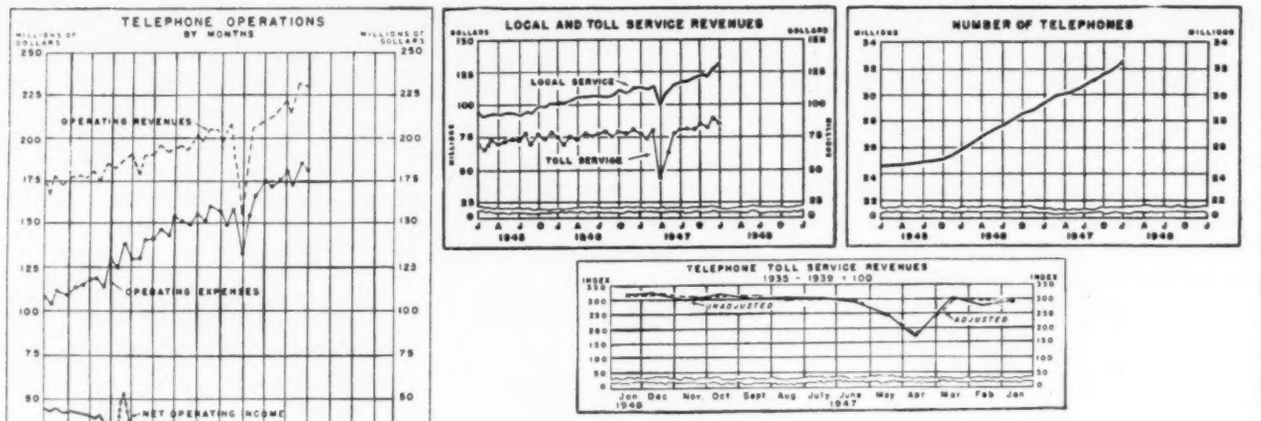
By denying the Dictaphone request, the Commission allowed the tariffs, calling for a $5 installation charge and $2 monthly rental, to become effective. It also refused the plea of the manufacturer for warning-less sales demonstrations. Dictaphone took the position that the requirement of installing the warning unit on the premises of prospective recorder customers who try out the devices, with the $5 installation fee, would hinder the sale of recorders.

House to Probe FCC Common Carrier Moves

ALTHOUGH it had been commonly assumed in Washington that the House select committee to investigate the FCC would concentrate entirely on broadcast matters, an authoritative source has informed TELECOMMUNICATIONS REPORTS that investigators of the group are looking into the Commission's activities in common carrier matters.

It is felt that such studies are being concentrated more on the telegraph and international fields than on telephone matters, but the move may be significant in illustrating the possibility that the House probe will be more far-reaching and possibly more effective than had been expected earlier.

The probers are moving cautiously, investigating thoroughly before making any charges against the FCC, and the investigation is not assuming the "circus" atmosphere which has pervaded many similar activities on Capitol Hill. To obtain orderly procedure, likewise, the committee is conducting its hearings on a case-by-case basis, rather than permitting witnesses to make categorical charges against the agency over a broad field, which frequently turns such investigations into a shambles.—THE END



Latest FCC Statistics On The Telephone Industry

Experiences Of A Small Company

In Obtaining Rate Increases

By

LA MAR STOOPS

Manager

Nappanee (Ind.) Telephone Company

THE SUBJECT, "*Experiences of a Small Company in Obtaining Rate Increases,*" is in my opinion the choice assignment of the conference. Choice, because it does not imply the offering of advice or the presentation of a fool-proof formula.

So you may orient yourselves to our situation, it appears to be in order to briefly give the status of the Nappanee Telephone Company. We operate only in Nappanee (Indiana) and adjacent rural territory. Nappanee is a little city officially "clocked" at 3,100 population as of the last federal census, but probably has a population of about 4,000 today. Our company currently serves 1,437 telephones, all common battery. We are a toll center, but have no tributaries.

Late in 1946, although we were at the time in sound financial condition, we became alarmingly aware that *operating expenses* were increasing way out of proportion to *revenues*. At that time too, we recognized we were in for another substantial round of pay roll increases. So, we sharpened our pencils and proceeded to prepare a projected earning statement for the year 1947 in the light of anticipated additional expenses. The results of the projected statement disclosed, beyond any question of doubt, that to remain financially sound it would be necessary to obtain additional revenues through increased rental rates.

How to proceed? In a small company we may *acquire a little knowledge about a lot of things, but probably do not become expert at any one thing.* Therefore, recognizing that we were completely inexperienced in rate case proceedings, we first of all counseled with our good neighbors who had recently been "through the mill' and obtained valuable information from them. We are indeed grateful for their help, and while we may not be able to repay them in kind, we have since passed on information to others, a sort of, "*you scratch my back and I'll scratch somebody elses*", arrangement.

Following preliminary investigation, we employed the services of a competent local attorney. Along with our attorney, we counseled with an accountant who has had many years experience in rate case proceedings. The accountant was employed in an advisory capacity only, and made recommendations regarding the preparation of exhibits and proceedings before the regulatory body. We found the accountant's guidance to be most valuable.

Time will not permit presenting the details of exhibits (*See Table I*) offered at our hearing. It may be of interest, however, to state that all exhibits were prepared with the idea

in mind to minimize the time required to present our case. Perhaps a minor detail, but on each exhibit we had all lines and columns numbered, thereby simplifying the task of analysis for the regulatory body and the petitioner. This system was especially helpful when, upon examination by counsel, certain statements and figures required cross-references and supporting evidence. We also had a sufficient number of copies of each exhibit to present to all participants in the hearing.

Inform Employees and Subscribers of Rate Needs

INASMUCH as the increased rates requested were primarily for the purpose of meeting additional pay roll expenses already in effect, we held a meeting with all employees in which we outlined the necessity for increased rates. We explained to them that although the wage adjustments were currently in effect, their continuation depended on a successful termination of the rate increase proceedings.

We considered the matter of informing our subscribers of our requirements for additional revenues one of major importance. For this purpose we used three mediums of approach: (1) Newspaper advertising; (2) a series of 22″ x 28″ posters displayed in our main office, and (3) presentation of our requirements before the local Kiwanis Club.

Our newspaper publicity consisted of six paid advertisements and two news releases covering a period of two months prior to the scheduled date for hearing. To start with, the newspaper copy was broad and general in scope. As we neared the date of the hearing the copy offered was more specific, and the final copy was more or less a summary of subjects previously covered, along with a schedule of the proposed rates.

During the year 1947 it was a policy of the Kiwanis Club, as a program feature, to conduct tours through the principal local industries. They accepted our invitation to make a tour of the telephone office with the knowledge that a part of our program would be to acquaint members with our problems relative to the proposed rate increases.

In closing, I might state that our hearing was an orderly affair with no subscribers appearing in protest. Of prime importance, *the rates petitioned for were granted.* (*Abstract of address presented before the* 1948 *Executives' Conference of the United States Independent Telephone Association.*)

Table I—Subject Matter of Exhibits Prepared by Nappanee Telephone Company and Order in Which They Were Offered in Evidence at the Hearing.

(1) Petition for Rate Increase, Showing Present and Proposed Rates.
(2) Comparative Balance Sheets, Showing Assets and Liabilities as of Dec. 31, 1945, and 1946, and March 31, 1947.
(3) Statement Showing Estimated Net Annual Increase in Operating Expenses for 1947.
(4) Statement Showing Method of Arriving at Estimated Increases in Operating Expenses for 1947.
(5) Statement Showing Present and Proposed Rates as Applied to Stations in Service March 31, 1947, and Estimated Increase in Revenues.
(6) Comparative Income Accounts for 1945 and 1946, Also, The Estimated Results After Giving Effect to the Proposed Rates and Increased Operating Expenses as Applied to 1946 Operations.

Other Statements prepared in Exhibit form, portions of which were offered in oral testimony only, included the following:
(1) Detail of Operating Expenses and Stations in Service, 1945 and 1946.
(2) Distribution of Wages.
(3) Distribution of Salaries.
(4) Materials on Hand In Process of Installation.
Note: This work-sheet and the one following, was prepared for the purpose of establishing additional depreciation expense.
(5) Present and Anticipated Plant Investment.
(6) Comparative Wages and Salaries Paid Considering 1939 as Index of 100.

Table II—Summarization of Subjects Presented by Posters and Charts Prepared by Nappanee Telephone Company to Inform Subscribers of the Company's Need for Increased Rates.

Chart No. 1: Value of Service to Each Subscriber Increases As Number of Telephones Increase.

In this chart the company shows that whereas in the year 1898 each subscriber could talk with only 52 other telephones, in 1939 each subscriber could call 902 telephones, and in 1947 each subscriber could call 1,335 telephones. (Currently each subscriber may be connected with any one of 1,437 telephones.)

Chart No. 2: Telephone Business Is the Only Business in Which Unit Costs Increase As the Size of the Business Increases.

This statement was simply illustrated in graph form.

Chart No. 3: Unit Costs of Outside Plant Increase With Plant Growth.

This chart merely supplemented No. 2 and was designed primarily to show that in order to expand a telephone system it becomes necessary to run new lines all the way between subscriber and the central office. This in contrast to merely extending existing lines as in the case of electric power lines.

Chart No. 4: Unit Cost of Central Office Equipment Increases As Number of Line Units Increase.

This chart also supplemented No. 2. It disclosed that whereas the company increased its line capacity by 22% during the period 1939 to 1947, it increased central office equipment value 50% for the same period.

Chart No. 5: Operator's Wages.

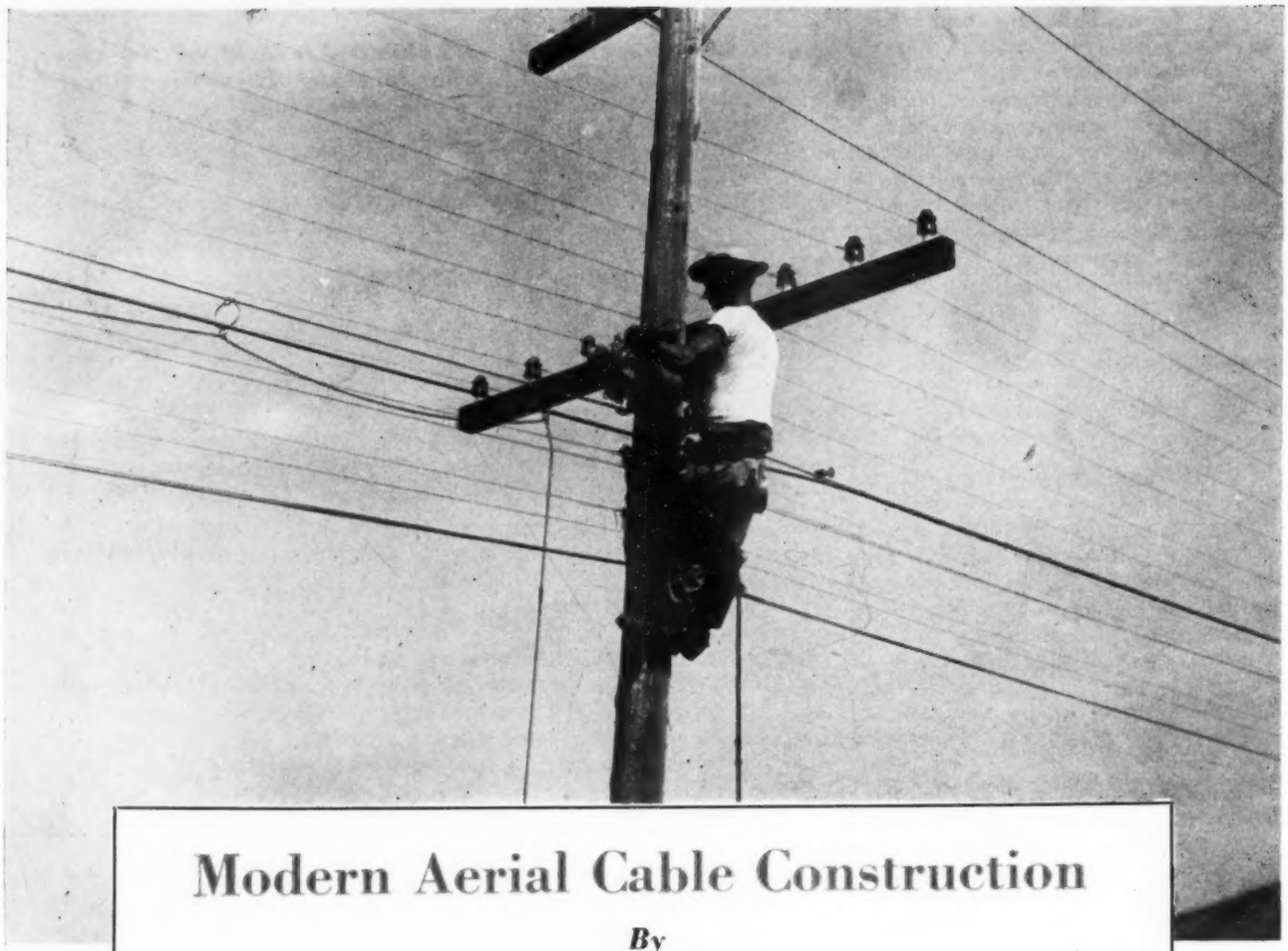
In this chart the company showed that the cost per hour of operation of the switchboard, all positions "manned," had increased 400% during the period from 1939 to 1947.

Chart No. 6: Revenues.

This chart showed that revenues had increased 93% during the period 1939 to 1946.

Chart No. 7: Expenses.

This chart disclosed that expenses would, on an estimated basis, reflect an increase of 182% for the year 1947 as compared to 1939.



Modern Aerial Cable Construction

By

G. A. KLEIN

VICE PRES. & GENERAL MGR., Nebraska Continental Telephone Co.
(A Gary Group Operating Co.)

This is the final article of a four-part series on aerial cable construction. In previous issues Mr. Klein discussed building the pole line, placing the suspension strand and a description of the actual placing of the cable itself, by the "spinning" method.

AT LOCATIONS WHERE it is necessary to splice the cable, such as at points where the cable changes size, or where the reel runs out, or sometimes at terminal splices, a lap of about 36 inches should be left to provide plenty of cable for the splice. This lap should be so located that the splice will be about 24 inches from the pole, and preferably on the exchange side of the pole.

There is considerable discussion among construction men as to whether or not the cable should be cut at the terminal poles. From personal observance and from time studies it is the writer's conclusion that if the cable is small (51-pair or less in size) it will be economical to cut the cable at these points. If the cable is larger it should not be cut. The cutting of the smaller cables enables the splicer to place the lead sleeve in position without splitting and seaming it. It also saves the "piecing out" of the 11, 16 or 26 pairs to which the terminal pairs are bridged. The straight, wild splicing of the remaining pairs is a small operation taking very little time. On larger cables, however, the straight splicing of the unbridged pairs runs into enough work to justify the splitting and seaming of a lead sleeve and the "piecing out" of the pairs to which the terminal stub is bridged.

With any of the three methods of placing the cable, care should be taken to prevent it from being damaged. Sharp bends or kinks should be avoided, and the cable should not be permitted to drag over through-bolts, pole steps or other sharp objects. A good supply of cable rollers which may be fastened to the strand or used at other points will afford protection.

Very little time is required for actual spinning of a cable span. The machine may be pulled at a reasonable rate of speed, and only a few minutes are needed to advance it from one pole to another. The time-consuming parts of the operation are those of placing coils of wire in the spinner and taking it around the poles.

At the start of each span it is advisable to make sure that there is enough wire in the machine to complete the span. If the wire runs out

in the span it is necessary to splice it to a new coil, using compression type sleeves. However, the time required to set up a ladder and make the splice while the extra crew is delayed makes it desirable to hold these splices to a minimum. This procedure will of course result in numerous leftover pieces of coils—and as yet no satisfactory use has been devised for them. It is often suggested that they be spliced and reformed into full coils in the storeroom on rainy days. However, if the wire is prespliced in this way with sleeves the splices will not pass through the spinner. If a method of making welded splices is available this suggestion is practicable. If not, it will be found more economical to discard the pieces.

When the spinner reaches the pole the spinning wire is clamped to the strand at a point just behind the machine, by means of a special tool called a spinning wire clamp. The wire is then cut, leaving enough end to reach the pole. The machine is removed and placed in position on the other side of the pole.

The loose end of the wire just cut is then spiralled by hand tightly around the cable and strand from the spinning wire clamp to the pole, and temporarily secured by lashing it around the suspension clamp and the through-bolt.

If necessary, the machine is then loaded with a new coil of wire, the end of which is also temporarily secured around the suspension clamp and through-bolt. All is now ready for spinning the next span.

THE NEXT STEP in aerial cable construction is the placement of the cable terminals. Unprotected terminals are usually installed on the same side of the pole as the cable. With raked dead end poles, however, it is sometimes preferable to place them on the face of the pole, since it is easier for installers to work on them in this position for the connection or disconnection of drop wires. Protected terminals are nearly always placed on the face or back of the pole, in line with the lead, since their larger size makes them look somewhat ungainly if they are positioned on the side of the pole.

All terminals should be placed at least 18 inches below the cable. It is sometimes necesary to place the larger sizes of protected terminals still lower, so that the lid can be raised to full height without hitting the cable and strand. The terminal stubs should be fastened with cleats to extend neatly up the pole and turn

G. A. KLEIN

". . . completes valuable series on aerial cable construction."

along and underneath the cable to the splice.

At cable splices out in the span the spinning wire is wrapped spirally by hand around the sleeve and the strand in the regular way. As an additional support for the sleeve, one or more zinc straps may also be used. Care should be taken that the cable is permitted to extend straight from the ends of the sleeve for at least two inches before it is bent gradually upward and formed to lie closely to the strand.

After the splicing of the cable is finished—we will not attempt to go into the details of cable splicing here, since this is a subject for an article in itself—the dressing up of the attachments at each pole is in order.

TWO METHODS ARE used to protect the cable from chafing against the suspension clamps at the poles. One scheme followed by many companies is to place a special lead shield, which may be secured from any of the suppliers, around the cable at these points. If these shields are not available, satisfactory substitutes may be made from old cable sheath. The shield and cable are then lashed tightly to the strand and clamp with the ends of the spinning wire.

Another method is to place a zinc strap around the cable and strand on each side of the suspension clamp. The cable is then bowed down between the two straps so that it will not touch the clamp. The spinning wire ends are permanently made up around the clamp and through-bolt, but not around the cable.

On poles used jointly with the power company it is sometimes necessary to place guard arms above the suspension strand. The standard guard arm is 3¼″ x 4¼″ x 48″ in size. If the standard arm is not available a suitable substitute can be made from unbored crossarms.

These arms are required in some states and by some power companies on all poles where the separation between the cable and power conductors is less than six feet. They provide protection in that they keep power company workmen from contacting the grounded suspension strand while working on the power wires. They are also useful for attaching drop wires when these extend in several directions and would, if fastened directly to the pole, encumber the necessary climbing space.

The guard arms are attached to the pole about two inches above and parallel to the suspension strand. A regular gain is cut in the pole, and the arm is secured with a standard ⅝″ through-bolt. One standard 24-inch crossarm brace is attached to the arm on the inside (pole side) of it, with a ⅜″ x 4″ carriage bolt some 13 inches from the center. A half twist is placed in the other end of the brace so that it can be attached with a ½″ lag screw to the face of the pole, directly beneath the arm.

THE LAST STEP in the construction of an aerial cable project is that of properly grounding the cable and suspension strand. The first consideration here is to make sure that the office end of the cable is connected to a good ground—and there is none better than the water main system.

For spun cable it is not considered necessary to bond the cable to the strand as is the case with cable in rings. The close connection between the cable and strand made by the spinning wire is thought to afford an electrical path of such low resistance that currents will interchange freely without arcing.

If the down guys in the cable run are without strain insulators they will serve as a good path to the ground from the cable and strand through the eyebolt attachments to the anchor rod and anchor.

All protected terminals should be grounded with No. 8 copper wire and ½″x 6′ or ½″x 8′ ground rods, depending on the type of soil. These terminal grounds serve as additional ground for the cable system, since on the newer types of terminals the ground strips are permanently connected to the cable sheath. If the older types of protected terminals

Here indeed is a dial switchboard that provides for whatever future growth may come. It enables you to add lines and links in hours instead of weeks, at considerably less time and expense than was previously possible with relay-type switchboards.

Relay operation has always been preferred for small exchanges because of its dependable operation with a minimum of maintenance. Additions, however, called for factory installers, and involved considerable time and expense.

The Leich Dial System gives you both relay system dependability and quick, easy, inexpensive expansion up to the capacity of the board.

Whether your installation is 40, 50, 60, 70 or 80 lines, your Leich Dial System comes completely wired for 100 lines and 14 links.

See how you are prepared for future growth—with the Leich Dial System!

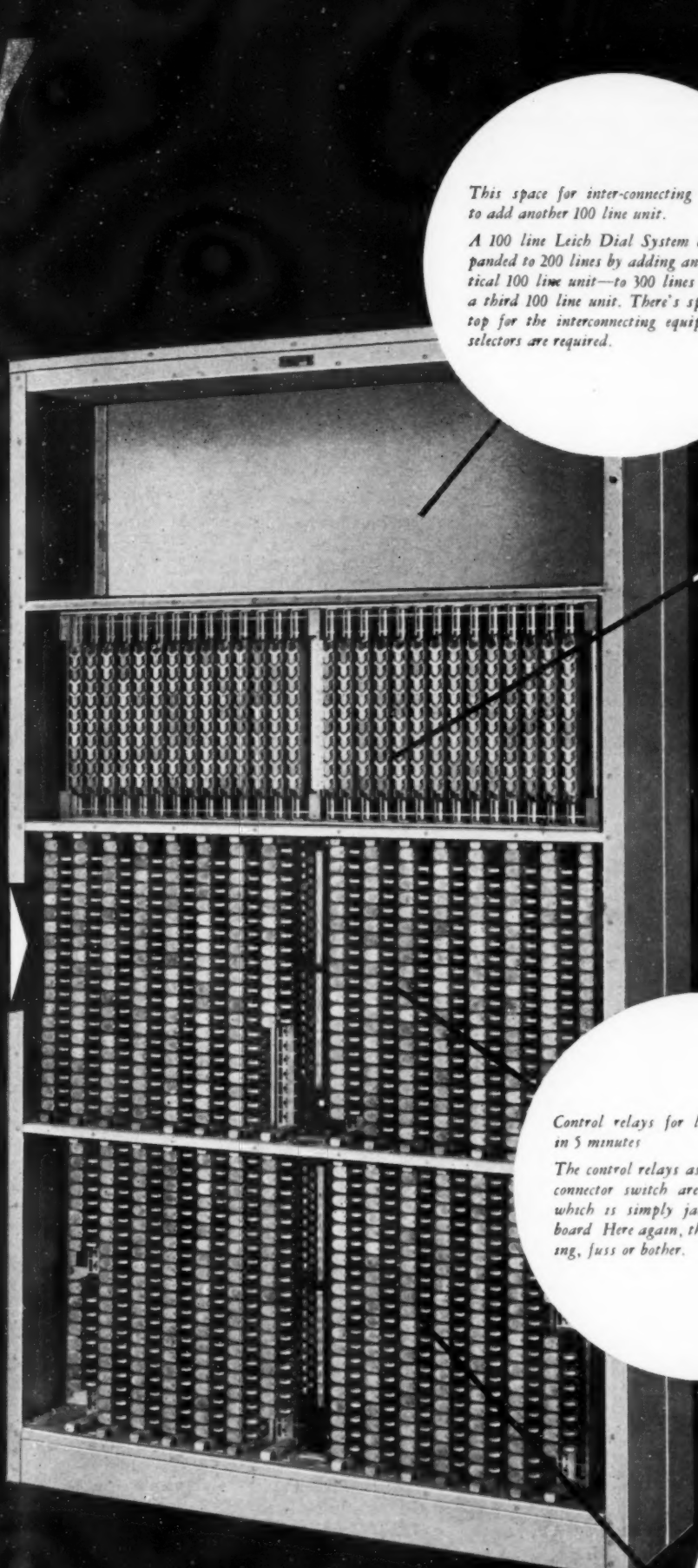
Groups of ten lines can be added in five or ten minutes by jacking-in to the initial equipment.

Finder-connector links can be added in a couple of hours. There's no soldering, no wiring. These units can be jacked-in by your own switchboard man. And your Leich Dial System is completely wired for the ultimate capacity of 14 links.

Thus the Leich Dial System not only gives you dependable, trouble-free operation, but insures you of adequate facilities with a very minimum of expense for whatever future expansion is necessary.

If you would like more information, write for our catalog which gives complete details. Address Leich Sales Corporation, 427 W. Randolph Street, Chicago 6, Illinois.

LEICH MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907



This space for inter-connecting equipment to add another 100 line unit.

A 100 line Leich Dial System can be expanded to 200 lines by adding another identical 100 line unit—to 300 lines by adding a third 100 line unit. There's space at the top for the interconnecting equipment. No selectors are required.

Links jack-in here—up to capacity of 14 on a single 100 line unit.

No soldering, no wiring. Links are jacked-in by your own switchboard man in an hour or two. The ultimate capacity of 14 links per hundred lines provides more than ample linkage.

Control relays for links can be jacked-in in 5 minutes

The control relays associated with a finder-connector switch are mounted on a panel which is simply jacked-in to the switchboard Here again, there's no wiring, soldering, fuss or bother.

Lines in groups of ten jack-in here. Board is completely wired for 100 lines.

Relays for ten additional lines are mounted on a single framework. This comes in a single package from the factory, can be jacked-in in five minutes time. There's no installation expense whatsoever, no wiring, no soldering.

All books revieved in this department may be obtained direct from Telephone Engineer Publishing Corp., 7720 N. Sheridan, Chicago 26, Ill.

The Lineman's Handbook, by Edwin Kurtz, professor of Electrical Engineering and Head of Department, State University of Iowa, formerly Member of the Educational Department, The Milwaukee Electrical Railway and Light Company; 652 pages, 6 x 9, 682 illustrations, $5:00.

This book is a great manual of principles, data, methods, and cautions on all aspects of the lineman's work. Everything is covered, from the elements of electricity to maintenance of lines and first aid work. The writing is clear, simple, understandable. The treatment is complete, descriptive of everything you want to know, backed up with many illustrations, tables, diagrams, charts, and other explanatory and reference aids. Use it as thousands of other line department workers have—to check your methods against the practice of others, to get quick, dependable answers to problems that arise on the job, to brush up on special points, and for consistent study to improve your knowledge, grade, and earnings.

The book gives you preparation for practical work, in introductory chapters that familiarize you with every component of transmission lines—electrical fundamentals and electric circuits, the electric system from generation to distribution, even a chapter showing how transmission lines are designed—also description of all the materials of line construction; poles, conductors, hardware, tools, electrical apparatus, etc. With this sort of background, every line of the chapters on construction, testing, and maintenance that follow are twice as valuable. You know why things are done certain ways, how to meet problems with the right choice of materials and methods.

Developing Your Executive Ability, by Howard Smith, personnel consultant, noted lecturer, and instructor with Dale Carnegie Institute; 225 pages, 5½ x 8, $3.00.

This book tells precisely how you can win executive success. Showing that executive genius is not a quality one is born with, but the result of concentrated effort along the right lines, the book tells how to direct the same efforts and thinking which you already expend daily toward the definite goal of improving your executive ability. Packed with helpful pointers, it tells how the up-and-coming executive can make the most of his capabilities, grow in executive stature, and rapidly qualify for the upper bracket responsibilities and rewards.

The book provides such facts as: The secret of executive personality, three best ways to improve personality, 24 guideposts to productive thinking, 11 aids for making decisions, how to budget time most efficiently, 12 best techniques for instructing people, how to talk to groups effectively, etc.

Here is a practical, inspiring book which brings you an amazing success formula. It outlines a specific plan for cultivating the qualities which mark the top-flight business leader today.

Its Your Future, by Martin Panzer; 270 pages, 5½ x 8, $2.50. Here is a book that promises you much good, in a fuller, more successful and satisfying life . . . and shows you how to get it without undertaking complicated psychological analysis or rigid regimentation of your affairs.

It is a sensible bunk-less treatment, it explains simple ideas and methods for achieving success and happiness in terms of a satisfactory way of life within your opportunities and capabilities. It will help you set a reasonable and worthwhile goal—to reach that goal—and to enjoy life in the process.

In its 13 chapters the author analyzes and explains: The fears that cause most of our troubles; getting rid of encumbering fears; how to formulate a workable plan for advancement; getting happiness out of the things near at hand; a sensible idea for improving your relations with others; how to develop tact, judgment, memory, concentration, and insight; sizing up your personality quotient, and raising it; what knowledge you need and how to absorb it; how to hold your end up in discussion; how to acquire decisiveness; understanding your habits and making use of them; how a little bluffing can be an asset, and how to retain a youthful outlook.

having ground strips insulated from the sheath are used, the ground strips should be bonded to the sheath.

Additional grounds should be installed at intervals so that the cable run will have a ground approximately every 1000 feet, using No. 8 copper wire and ground rods six or eight feet in length. The ground wire should be fastened directly to the strand with strand ground clamps, and attached neatly to the side of the pole with staples. The ground rods should be installed approximately two feet from the pole and buried well below the ground surface.

Careful grounding of the cable system in accordance with the foregoing suggestions is especially important when the cable is on poles used jointly with the power company. The grounds offer a low resistance path for power currents in case there is a cross between the power wires and the cable system. The power line circuit breakers will immediately operate and disconnect the power source before any damage can be done to the cable, strand or telephone apparatus. When the cable system is not well grounded a cross with a power wire is likely to cause the strand to burn in two. Such a cross will burn holes in the cable sheath at irregularly spaced intervals sometimes as far as eight or ten spans from the actual cross.

In this respect there is a growing tendency on the part of some companies to attach the suspension strand to the power company ground on jointly used poles. This is achieved through connection to the power ground wires on the side of transformer poles, or at intervals directly to the neutral wire of the power company secondary circuit. When such an arrangement is made it is customary for telephone company employees to make the attachment of the connecting wire to the strand, and for power company employees to make the connection to the power facilities.

We have reviewed various subjects connected with the actual placing of the cable. We have considered spun cable versus ringed cable, a handy reel trailer, types of spinning machines, three methods of placing the cable by spinning, problems of splicing, the placing of cable terminals and pole attachments.

The four articles in this series are based on the writer's own experiences over many years. It is hoped that they will prove a handy reference for telephone men interested in and concerned with aerial cable construction.—THE END.

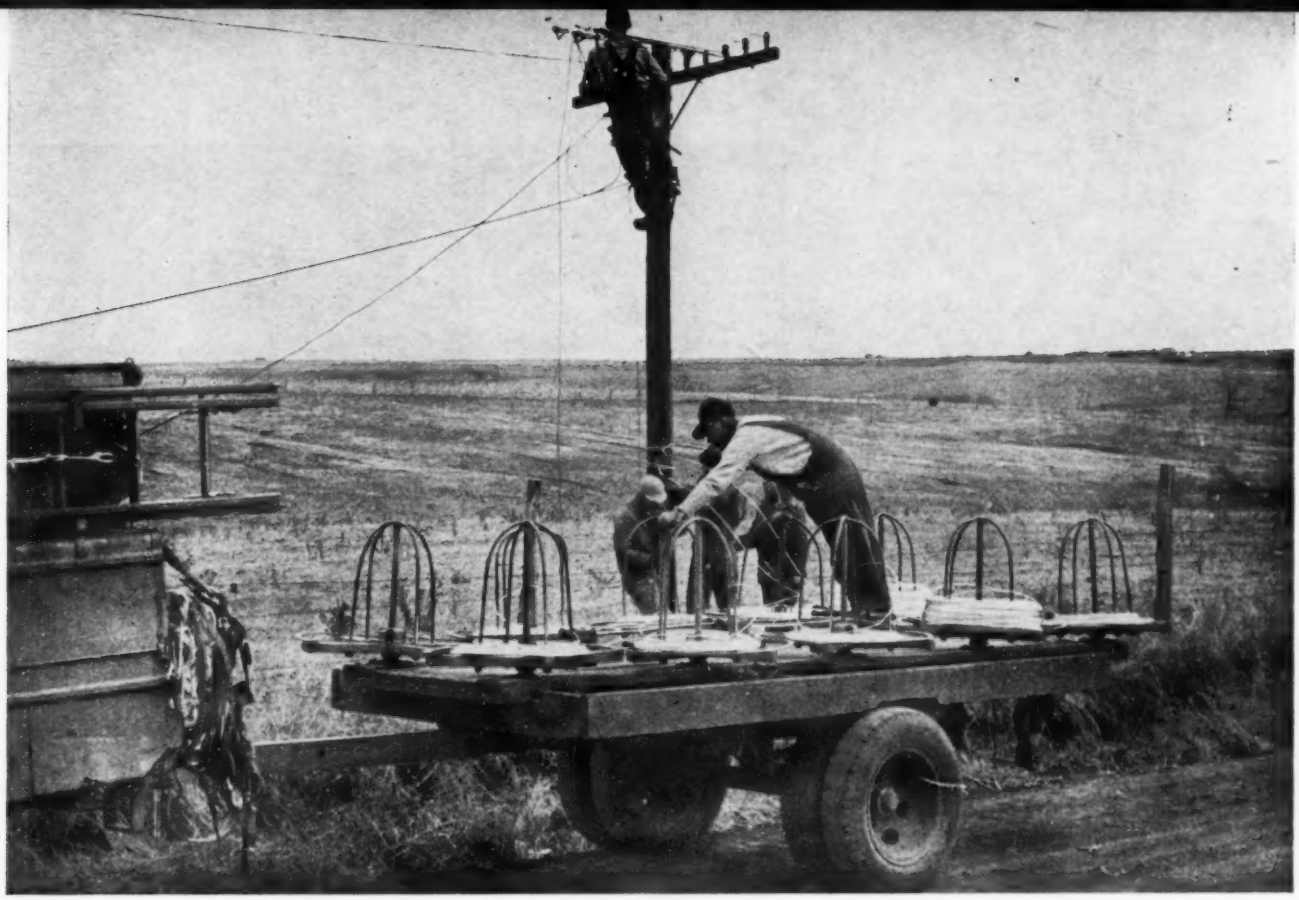


Figure 2. Showing special 10-reel trailer at start of pulling in operation.

Stringing LINE WIRES In RURAL LEADS

By
JOHN S. REED

Lincoln Tel. & Tel. Co.
Lincoln, Neb.

THE OPERATION of stringing line wires from pole to pole follows the setting of the poles and the guying of dead-end and corner poles. This operation requires a certain degree of skill and ingenuity to obtain even spans having the proper amount of sag. Furthermore, the line wires must be properly tied to the insulators to prevent tie-wire "burns."

It is a well known fact that wires that have been pulled up too tight in warm weather will develop excessive stress in cold weather and may break or become permanently stretched under ice loads. On the other hand, a wire span that is too loosely strung in the wintertime may sag considerably when the warm season comes, causing annoying difficulties with tangled wires or swinging shorts.

Improper methods, aside from causing the foregoing mentioned troubles, may result in high construction costs. There are several procedures for placing line wire, each one adapted to a particular situation governed chiefly by the nature of terrain in the locality of the wire stringing job. It is the purpose of this article to discuss practical methods of placing open wire. The subjects covered by the article are standard line material, equipment for stringing line wire, methods of stringing the conductors and sagging them, procedures for tying the wires to the insulators, and transporting the conductors.

Kinds of line wire considered standard for stringing operations are the following:

.109 (No. 128 BWG) BB steel wire

.109 (No. 12 BWG) HTL 85 high strength steel

.109 (No. 12 BWG) HTL 135 high strength steel wire

.104 (No. 12 NBS) hard drawn copper wire

.102 (No. 10 AWG) copperweld wire

Note: In the light loading district, No. 14 hard drawn copper wire is often used in rural leads.

The steel line wire is utilized almost exclusively in rural leads. For longer life and reduced maintenance costs, the HTL 85 high strength steel and the copperweld wires are recommended. The HTL 135 and copperweld high strength wires are particularly suited for long span leads.

Hard drawn copper wire is used in railroad crossing spans and in lines of extreme length where transmission losses would be excessive, if steel wire were utilized. Copperweld wire has much lower resistance than steel line wire and can be successfully used, when it is desired to combine good transmission properties with high mechanical strength.

The most satisfactory insulators are those made of glass. Standard types are the so-called "pony" (single-groove) or "exchange" (double-groove) insulators.

In the case of short open wire

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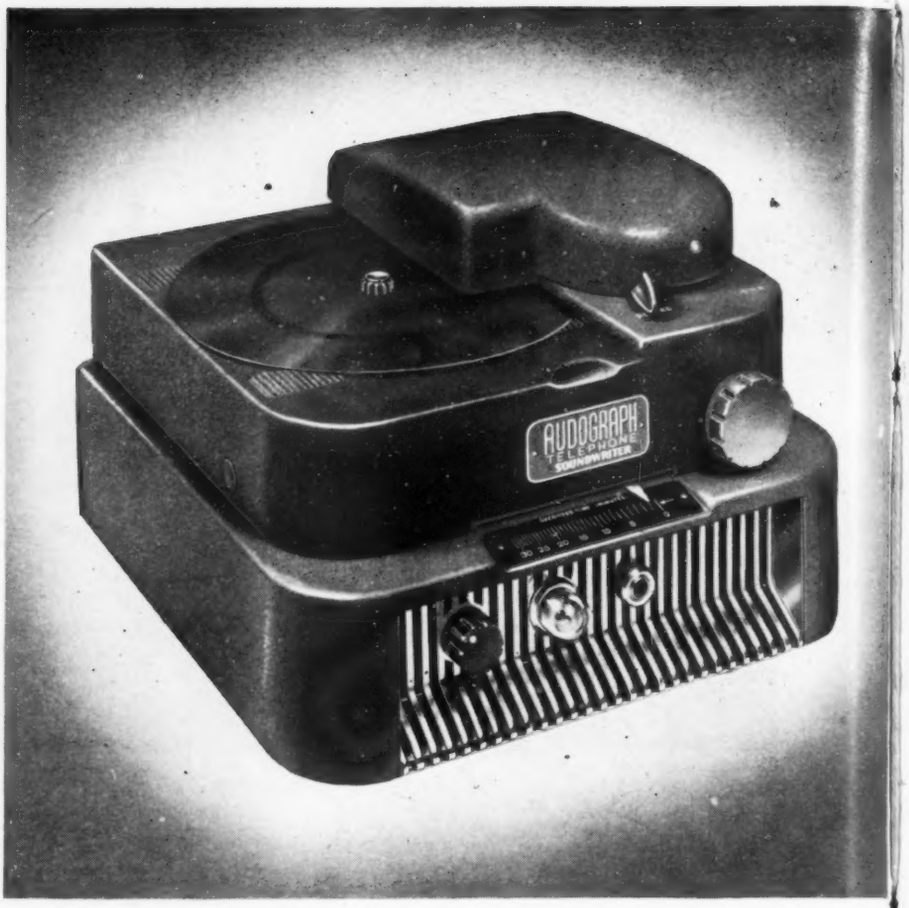

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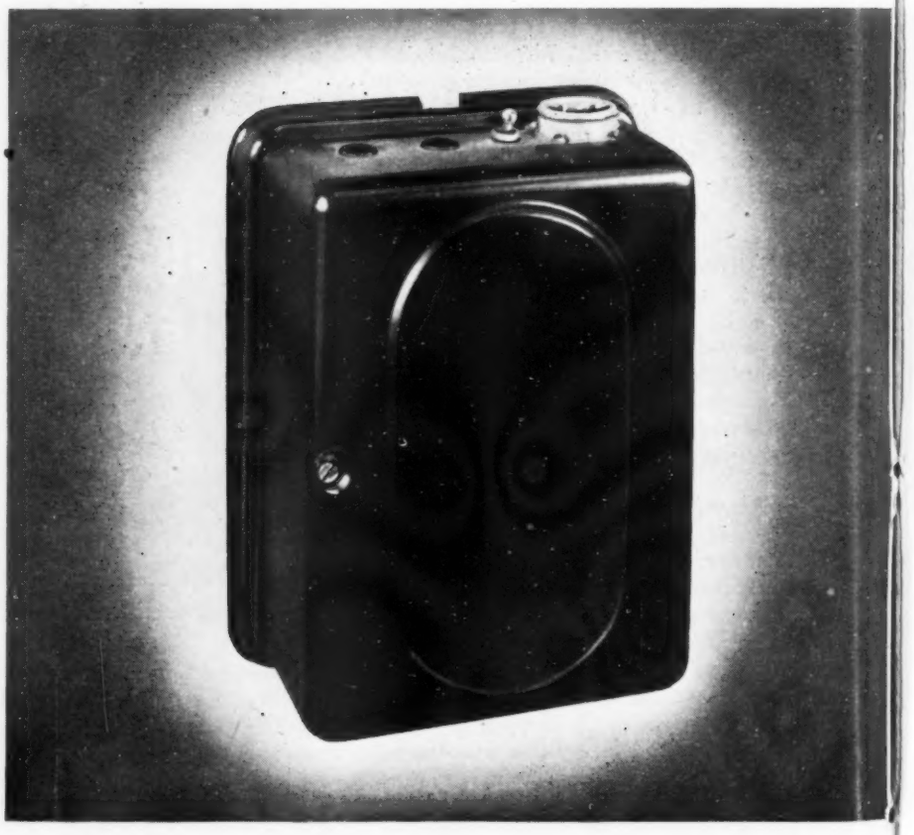
This unit includes the "warning tone" generator, timing interrupter and amplifier, and the necessary facilities for the physical connection and disconnection of the Recorder. It is designed so that telephone conversations cannot be recorded without the warning tone being sounded. The Automatic Electric Telephone Recorder Connecting Unit provides a choice of two levels of output, and may therefore be used either with a Recorder having automatic volume control (such as the Gray Telephone Recorder) or with a recorder without automatic volume control.



Reap Revenue from CONVERSATION RECORDING— Here Is All You'll Need!

THE recent order of the Federal Communications Commission authorizing the recording of interstate and foreign telephone conversations enables you to offer a *NEW* service—a service that many subscribers want, and which will provide you with a new source of revenue. And Automatic Electric is ready with just the equipment you will need. With the Telephone Recorder and the Connecting Unit shown here, you can be certain of meeting all requirements of the FCC order, as well as the needs of your subscribers.

The Gray Telephone Recorder is a specialized adaptation of the Gray Audograph—one of the most popular recorders of the modern disc-recording type. The Automatic Electric Telephone Recorder Connecting Unit provides the necessary means for physically connecting the Recorder to the telephone line, and for placing on the line the "warning tone" prescribed by the FCC order. A complete Telephone Recorder installation, including these two units and any standard telephone instrument, can easily and quickly be made by any qualified telephone installer.

Your subscribers will soon be asking you about telephone conversation recording. Let us send you complete information; you will then be ready to add to your earnings by offering them this new service.

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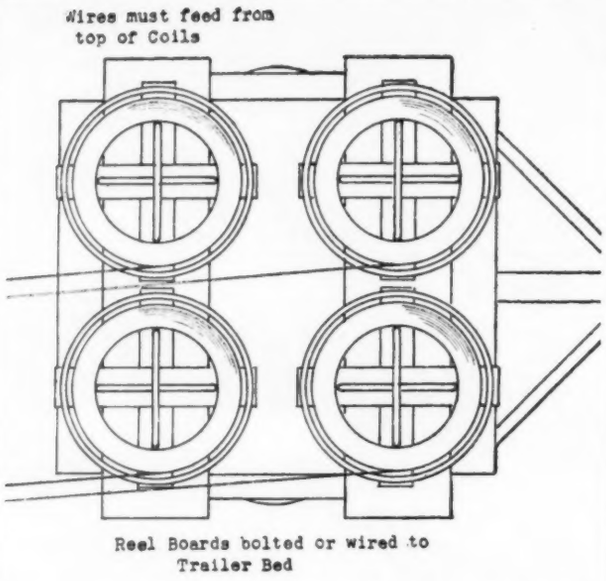


Figure 1. Two reel boards mounted on trailer for unreeling wire.

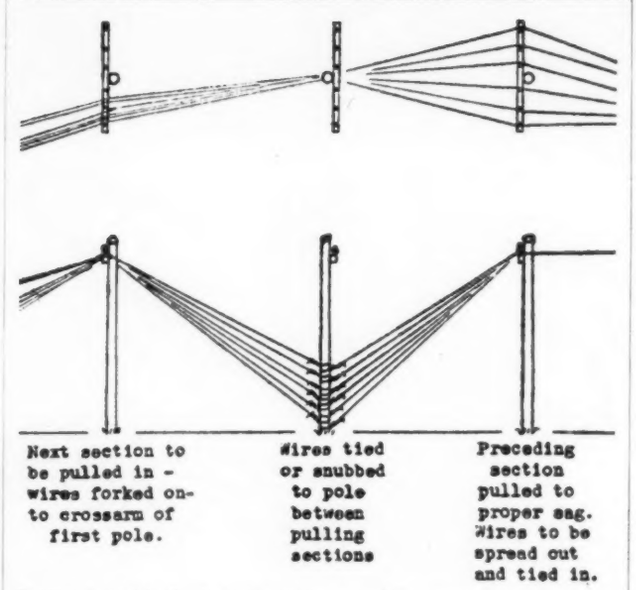

Next section to be pulled in - wires forked onto crossarm of first pole.
Wires tied or snubbed to pole between pulling sections
Preceding section pulled to proper sag. Wires to be spread out and tied in.

Figure 3. Method of dead-ending a pulling section and starting next section.

extensions, involving only a few spans of wire for a bracket lead, it is satisfactory to merely uncoil the wires directly off the coils and lay the conductors on the ground preliminary to raising the wires to the crossarms or brackets. Alternatively, a reel board may be laid on the ground and the wires pulled off the reels by hand.

For longer leads, time and effort can be saved by using one or more reel boards mounted on a trailer as illustrated in Figure 1. The trailer is then hauled along the road to lay the wires along the roadside.

When a large number of wires are to be strung, a special ten reel assembly mounted on a large trailer is utilized as shown in Figure 2.

Sometimes dense plant growths or other obstructions may make it impracticable to lay the wires on the roadside for lifting onto the poles. In such cases, the trailer may have to be blocked in position and the wires pulled off the reels with the truck. The best locations, for stationary reels, where possible, are at a major obstruction, such as a crossing highway with heavy traffic, cluster of trees, a power line, or a railroad crossing. In certain cases, it may be possible to set up the reels on top of a hill to reduce the pulling effort. In any event, reels that are located on a roadside must be kept out of the way of passing traffic, particularly on highways.

When using reel equipment, the coils should be so arranged that the wire will feed off top of each coil. Wire guides may be needed in the case of a large reel assembly to prevent tangling of the wires. Sometimes it is advisable to brake the reels by means of a rope passed between the reels. The rope ends are tied at the near end of the trailer or last reel board, and the loop at the front end of the trailer is held by hand or snubbed to a convenient support.

Great care is necessary in paying out the wires from the reels to prevent kinking or nicking the wires. A wire damaged in this manner is greatly weakened and will break under stress. When the wires are laid out on the ground from reels carried on a trailer, there is much less danger of damaging the conductors than when the wires are pulled off stationary reels.

Although this precaution may seem unnecessary, wires that are laid on the ground should not be stepped on by workmen or be run over by vehicles. Copper wire should not be dragged over rough or stony ground.

If a wire is inadvertently nicked or kinked in any way, it is best to promptly cut out the damaged part and then resplice the wire at this point. This precaution will save a service interruption to the rural subscribers and a trip of a maintenance man to repair the break.

Stringing the Line Wires— General Information

IN GENERAL, a wire stringing job should be planned to produce the fewest possible number of splices in the line wires. That is, if it is at all possible, the full length of each

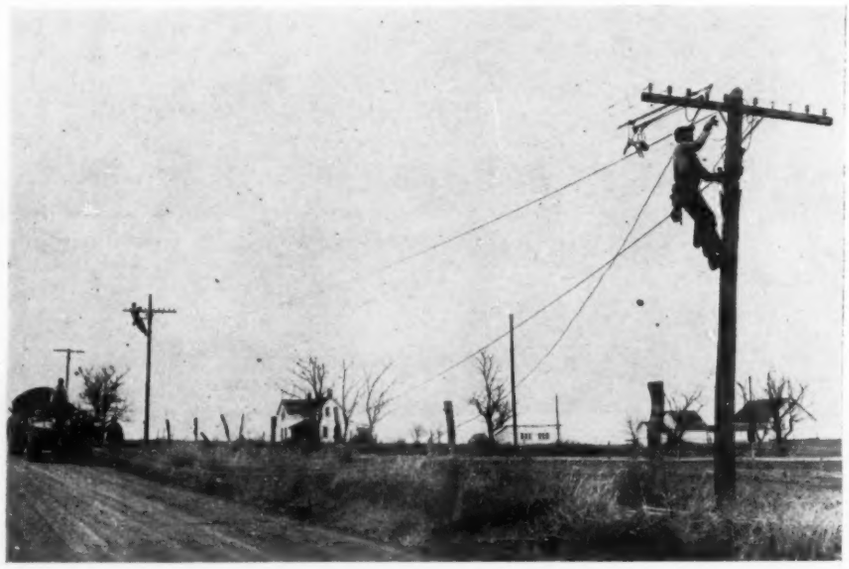


Figure 4. Unreeling the line wire along the roadside.

coil of wire should be strung with the splices occurring only at the coil ends. Such a procedure saves time and minimizes waste of good wire.

As a rule the length of each wire raising section should not be greater than one-half mile. In cases where major obstructions are present, it is usually desirable to reduce the length of such sections still further to minimize wire raising difficulties.

Especial care should be taken at a highway crossing point to prevent accidents resulting from the wires snagging on passing vehicles. A man should be stationed at this point to warn the traffic of the presence of the wires. As soon as the reel trailer has passed the crossing, the wires should be raised to the poles without further delay. If the traffic is heavy and cannot be held up for any length of time while the wires are on the road, the wires should be lifted as necessary, so that the vehicles can pass under them, rather than run over them. As the wires are raised to the poles, they should be carefully watched to see that they do not catch on vehicles passing under them, as it is very difficult for the motorist to see them.

When the wires pass under a power line at a highway crossing, the wires should be tied down temporarily, if there is any apparent danger that they will rise up in the air on being pulled taut. In crossarm leads, the wires on the uppermost arm may be held down by means of a handline passed around the pole over the wires and then around the crossarm at each end, with the rope ends securely tied at the latter points. In the case of wires on a lower crossarm, a handline may be fastened from one end of the upper crossarm to the corresponding end of the lower crossarm, if considered necessary to prevent the wires from slipping out at the side.

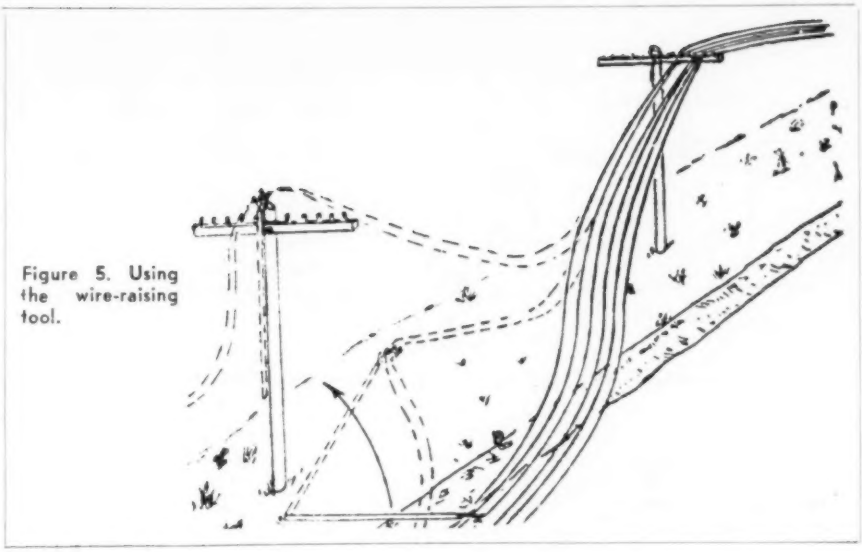


Figure 5. Using the wire-raising tool.

Wire Raising Procedure— Wires Laid on Road Side of Lead

IN THE FOLLOWING procedure, the wires are strung from the side of the road, using a trailer with reels mounted on it as shown in Figure 2.

The wire ends are attached to the base of the pole, as shown in Figures 2 and 3, or at the top, if the pole is guyed or otherwise supported against an unbalanced pull.

The trailer is then hauled close to the roadside to pay off the wires along this side as indicated in Figure 4. As the wires are unreeled, they are lifted onto the poles with a wire raising tool, as illustrated in Figure 5. The raising of the conductors is greatly facilitated if the butt of the handle is placed on the ground with a foot held against the butt and the handle then pivoted up. The wires can then be carried in the fork of the tool over to the pole and lifted onto the crossarm or brackets.

Another method that may be more convenient under certain circumstances is to use a handline to lift the wires to the poles, as shown in Figure 6. To avoid tangling, the conductors should be lifted in bunches of two to five wires, looping the handline around each bunch with the loops one or two feet apart as illustrated. The last bunch is attached by means of the snap hook at the end of the handline. It is not advisable to raise more than can be readily handled at one time.

The wires should be placed between insulator pins in bunches of convenient size, say 4-2-4 or 5-5 wires for ten conductors to facilitate pulling up the wires.

When the end of the pulling section is reached, the wire ends are fastened to the last pole of the section and pulled up preliminary to adjusting the wire sag as explained later on.

Figure 6. Lifting wires to the pole with handline.

Wire Raising Procedure— Wires Laid on Field Side of Lead

IF IT IS necessary to string the line wires from the field side of the pole lead and it is impracticable to unreel the wires from a moving trailer, the wires must be pulled off stationary reels. In this case, the trailer and reels are blocked in position at a point by the lead where the wires can be unreeled first in one, and then in the opposite direction along the pole lead as shown in Figure 7. In this way, the trailer need be moved to a new location only after two half-mile sections have been strung.

The wires are attached to a running

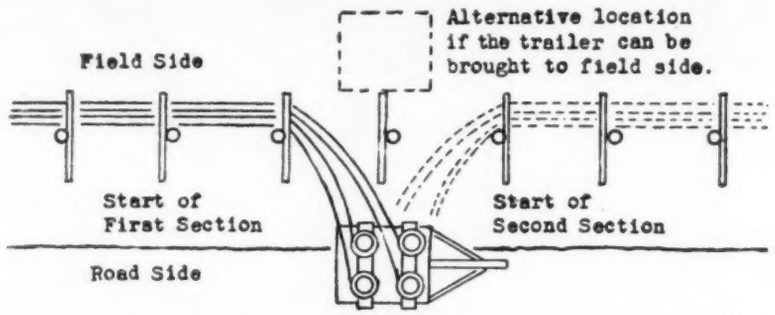


Figure 7. Stationary reels used for pulling in wires from field side of pole lead.

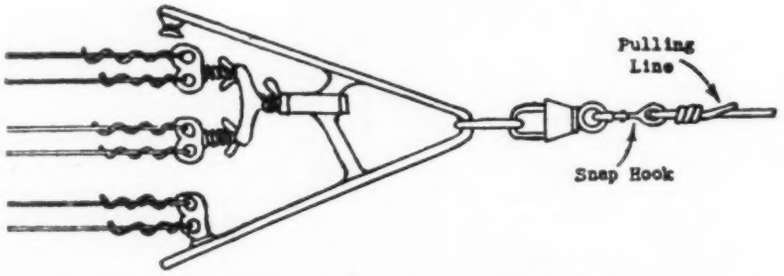


Figure 8. Running board used when wires are pulled off stationary reels.

board as illustrated in Figure 8 and then brought to the field side of the lead. A pulling line (⅝ inch manila rope), one to three spans long, is fastened to the running board. The rope is laid out on the field side of the poles for its full length and tied to the truck. The truck pulls the wires the required distance and then is stopped while the pulling line is unsnapped and passed around the pole to be re-snapped on the field side, as indicated in Figure 9.

When the end of the pulling section is reached, the men fasten the ends to the last pole of the section and then go back over the section to raise the wires onto the pole. On arriving at the starting point, they pull the wires to the correct tension and fasten them to the first pole of the section.

The crew then reels out the wire in the direction opposite to the first section pulled in, raises the wires, and fastens them to the end poles in the same manner as previously explained.

On completing the second section, the wire ends of the two sections are spliced together. The reel equipment is then moved to the section beyond the last half mile just completed and again set up to continue the wire stringing operation in the next two sections.

When the end of the pulling section is reached, the wires are snubbed on the crossarm close to the pole itself. The conductors are then pulled up, using as many men as required to pull slack out of a like number of wires (Figure 10). Each man takes one wire and all pull at the same time. (The wires should not be pulled one at a time, as this only causes them to become tangled.)

Another way is to attach as many wires as considered convenient to the rear end of the trailer with slack blocks (or wire eveners as shown in Figure 11), and then drive the truck ahead to take out most of the slack. If wire eveners are not being used, the slack blocks are employed to pull the wires to the proper sag and to even up the conductors.

After the wires are pulled and properly adjusted for sag, they are fastened to the pole, either by means of slack blocks as shown in Figure 12 or by tying the wire directly to the pole (Figure 10).

One or two men may be dropped back to tie in the wires while the rest of the crew proceed to string the next section. When the end of the lead is reached, the wires are pulled up and fastened to the dead-end pole. The men then go back over the lead and splice together the ends of the wires between the sections, if they have not already been connected together by the workers who were previously dropped back.

Adjusting Wires For Proper Sag

DURING the pulling up operation, the wires are given slightly more tension than required and then slacked off to the proper tension. This preliminary treatment stretches the wires slightly and helps even up the spans. In this way, the development of irregular sags is minimized.

The proper tension is most easily determined by selecting a wire span near the pulling end and slacking off the wires until the sag in that span reaches a predetermined value. The proper sag is obtained from a wire sag table for the span length and air temperature. (Wire sag tables are found in telephone handbooks and manufacturers' manuals readily available to any telephone organization.)

In crossarm leads, the wire sag is most easily measured by means of sighting gauges. One gauge is placed on the crossarm of the sighting pole and the other gauge on the crossarm of another pole, as illustrated in Figure 13. The targets on both gauges are adjusted to the proper sag value obtained from the sag table. (NOTE: If the sag value is greater than the range of one set of gauges, two gauges may be combined to in-

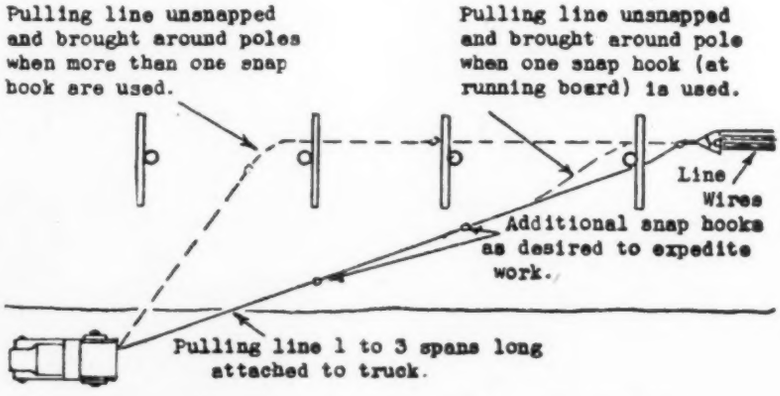


Figure 9. Pulling line wires along field side of pole lead.

crease the range.) The gauges are placed on the crossarm in such a position that the line of sight crosses the wires at an angle, as illustrated, instead of paralleling them. This makes sighting much easier.

While one man sights across the top of the targets, as shown in Figure 14, the other men slack off the wires until their lowest part just touches the line of sight.

In bracket leads, a piece of lath is nailed on the two poles supporting the span selected for the sighting procedure at the correct distance from the groove of the glass insulator on the lowest bracket, corresponding to the desired sag. The lower wire in the span is then slacked off until its lowest part touches the line of sight from one lath to another. The upper wire is then adjusted to the same sag as the lower wire.

Tying In Line Wires

IN TYING line wires to insulators, the wires are placed on the inside of the insulators, except in the case of pole pair insulators on crossarms. At corners in the line, the wires should be placed to pull against the insulators, as shown in Figure 15. (In certain cases this may cause one or more wires to come in contact with the pole. In crossarm leads, the insulator pins of the wires affected are relocated farther from the pole. On a corner pole in a bracket lead, additional brackets are placed to enable the wires to clear the pole in going part way around it.)

To tie steel line wire to insulators, the procedure illustrated in Figure 16 is recommended. For this purpose, 12-inch lengths of 109 (no. 12 BWG) B.B. iron wire ties are utilized. For copper wire lines a different procedure is needed. Twenty-four inch lengths of 104 (No. 12 NBS) annealed copper are used in this case.

Transpositions are essential to prevent crosstalk between ad-

(*Please turn to page 74*)

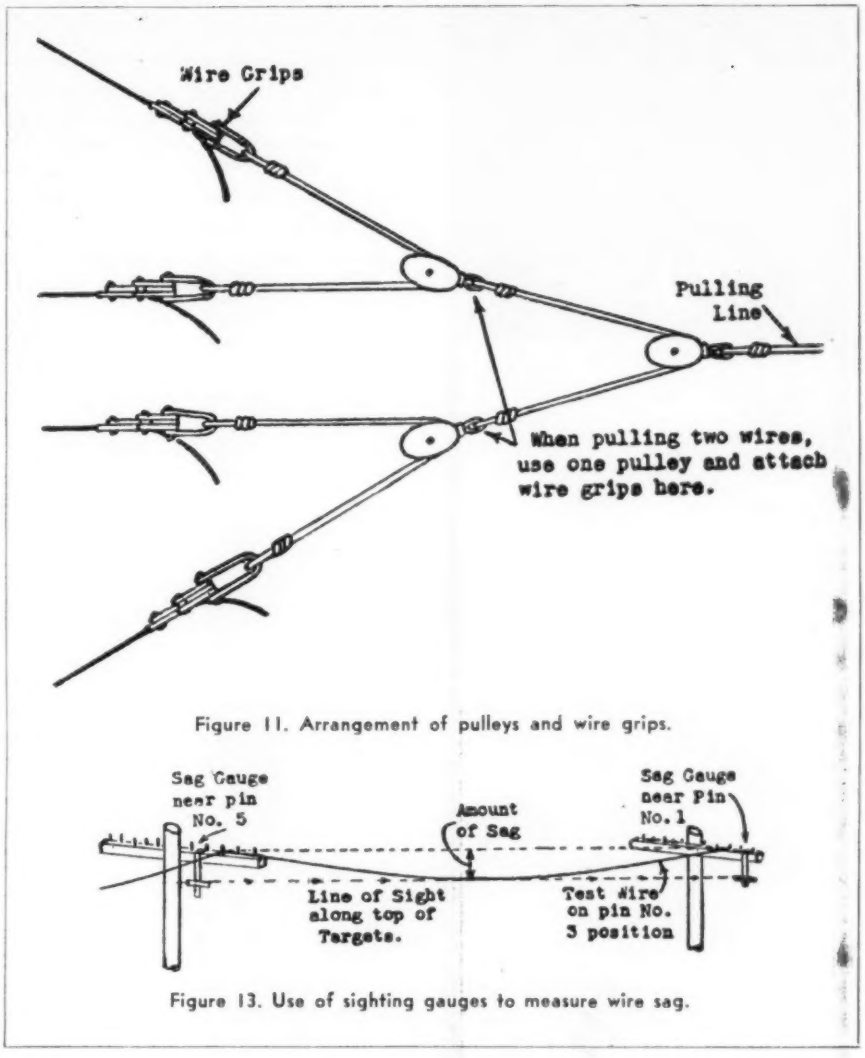

Wire Grips
Pulling Line
When pulling two wires, use one pulley and attach wire grips here.
Sag Gauge near pin No. 5
Amount of Sag
Sag Gauge near Pin No. 1
Line of Sight along top of Targets.
Test Wire on pin No. 3 position

Figure 11. Arrangement of pulleys and wire grips.

Figure 13. Use of sighting gauges to measure wire sag.

Figure 10.
Pulling up line wires by manpower.

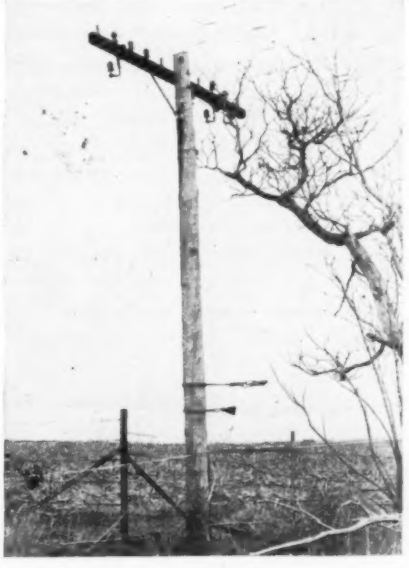
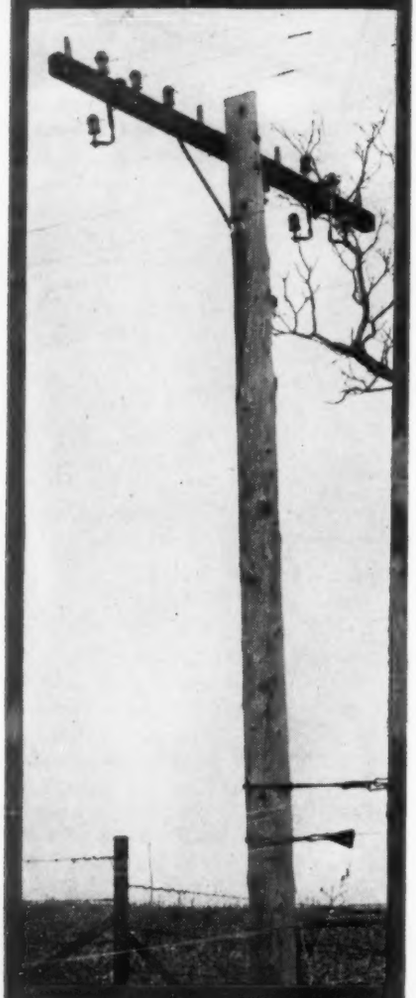


Figure 12.
Fastening of line wires to last pole.

Figure 14.
Sighting by worker on pole.

Line and Desk Discussions



By JOHN S. REED

Busy Lamps . . .

Q. We notice that a great deal of heat is emitted by a strip of busy lamps on a switchboard, when the traffic is heavy. Wouldn't this heating effect result in damage to the insulation on the jack strip?

A. The jack strip insulation may, in time, be damaged by heat from the busy lamps. If you are using lamps of full-voltage rating in the busy lamp strips, you may try putting in lamps of higher voltage rating, such as 48 volts on a 24-volt switchboard. Of course, they will not glow as brilliantly as the lamps or normal voltage, but they will be bright enough for the busy strip. This method will also reduce current consumption.

Grass Fires . . .

Q. In our locality we have frequent grass fires that weaken our poles and in some cases have destroyed a number of them. What method will prevent this trouble?

A. The best method we know of for protecting poles from fires is to clear the grass away from each pole for about three feet around it and bank dirt around the pole a height of about two feet. Weed control, with hormone type weed killing chemicals, is another method that may benefit in reducing fire hazards in case of excessive weed growths around poles.

Lashed Cable . . .

Q. What do you consider to be the advantages of lashed cable construction? Can we easily lash cable in existing installations by ourselves?

A. The lashed cable construction, which calls for the use of spinner wire and zinc straps has proved superior to the ring suspension construction. The advantages are a neater appearance of the cable, the elimination of mechanical damage to the cable sheath, such as that due to ring cuts in ring supported cable, and saving of labor and material costs in installing the cable. As in the case of ring-supported cable, however, special attention must be given to the proper support of splices and corners in the cable lead as shown in Figures 1 and 2. The cable spans must be kept relatively short, not more than 150 feet.

Figure 2.
Well constructed cable corner. Note use of zinc straps at corner in lashed cable.

It is a comparatively simple matter for any telephone organization to use the lashing method, if the proper tools are employed for this purpose. At least one company has trained its cable splicers to lash the cable to the strand in existing installations. The practice in this case is to have two men systematically go over the cable plant in a given location, soldering over cuts or breaks in the cable sheath and rewiping defective sleeves wherever necessary. When this preliminary work is done, these men then lash the cable to the sheath with a spinning machine. Under normal conditions, they can lash 15 to 20 spans a day.

Electric Fence Noise . . .

Q. What is your opinion as to the probable cause of electric fence noise heard on a rural line? We have had such trouble recently and they are hard to locate.

A. Trouble due to an electric fence in the vicinity of a telephone line does

Figure 1. Method of supporting splices in lashed cable construction. Above—splices in 100-pair cable. Below—splice in 600-pair cable.

not occur in the case of well-designed and well insulated electric fences. If, however, there is a leak to the ground anywhere along the fence, the high frequency oscillations due to the make-and-break effect of the interrupter in this equipment will be induced in the telephone line. Being of very high frequency, the oscillations are not audible, unless there are poor splices in the line. In this case the rectifying effect of the oxidized surfaces of the splice will render the oscillations audible. This is manifested as a slow ticking sound. The remedy is to locate and cut out all bad splices in the line and to eliminate the leak from the electric fence. In the latter case, it is necessary to contact the owner of the fence and enlist his cooperation in locating the points where the high tension current leaks to ground.

Calls By Number . . .

Question:—In small exchanges should we insist on our subscribers placing their calls by number rather than by name?

Answer:—Customers should definitely be encouraged to place calls by number rather than by name.

It is not expected that operators will learn the telephone numbers of subscribers. If the customer calls by number his call is more quickly completed. Calling by name very often requires a connection to Information or a delay while the operator looks up the number.

Customers calling by name lower the efficiency of new operators. A new operator can be trained to do a good job of operating in a relatively short time but if she has to memorize all the subscriber's numbers it may take months before she can handle as many calls as more experienced operators.

Ground Rods . . .

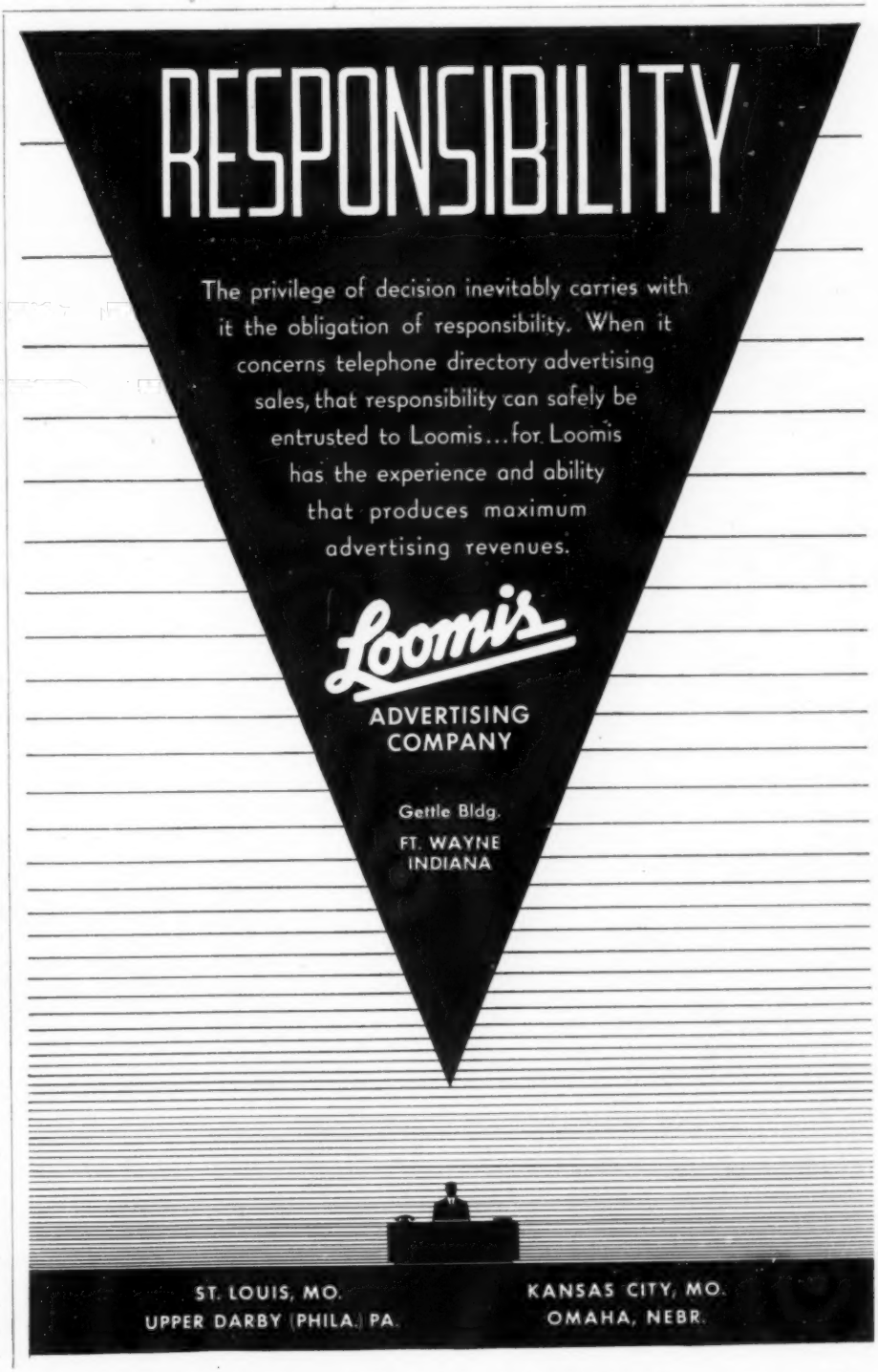
Q. What is the most satisfactory size of ground rod that should be used for substation protectors when a regular water pipe ground cannot be used?

A. Many telephone men favor the ½" x 5'0" or 6'0" copperweld or galvanized iron ground rods for use in substation protector installations. Others prefer the 3/8" diameter rod for the same purpose. One large middlewestern company has successfully used 1/4"x5'0" copperweld ground rods for many years. Since the 1/4" diameter rods are not ordinarily obtainable on the market, this company purchases the rods, cut to desired lengths from No. 2 B & S copperweld wire and solders lengths of 104 annealed copper wire to the rods for tails. On account of the smaller diameter, it is not necessary to point the ends of the rods as is done in the case of the larger size ground rods. The 1/4" rod is easily driven into the ground by the puddling method, in which water is used to soften the earth so that the rod can be "pumped" into the ground.

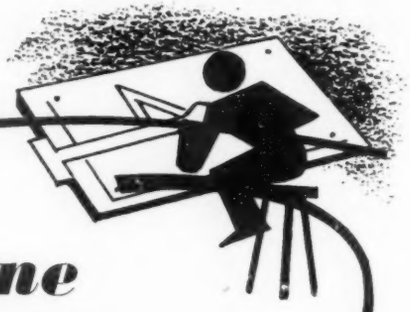
More important than the kind or size of the ground rod, however, is the condition of the soil in which the rod is driven. In all cases where practicable, the location selected should be moist at least much of the time. The ground rod should not be closer than 6 feet from a power ground in the same vicinity.

Free Help on Problems

IF YOU DON'T see a ready answer to your questions, let TELEPHONE ENGINEER'S staff of technical men tackle it for you. This is a free service. Your question and the resulting answer may not only solve your problem but help the many other telephone men reading these columns. Jot your questions on a postcard and look to LINE and DESK for reply.


RESPONSIBILITY
The privilege of decision inevitably carries with it the obligation of responsibility. When it concerns telephone directory advertising sales, that responsibility can safely be entrusted to Loomis... for Loomis has the experience and ability that produces maximum advertising revenues.
Loomis
ADVERTISING COMPANY
Gettle Bldg.
FT. WAYNE INDIANA
ST. LOUIS, MO.
UPPER DARBY (PHILA.) PA.
KANSAS CITY, MO.
OMAHA, NEBR.

Telephone Safety Tips

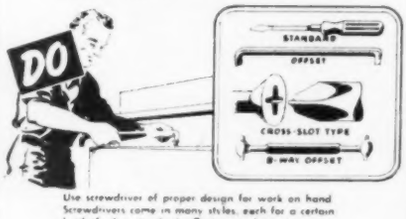


Never Hold Work In Your Hand—Avoid Injury

Always use a vise, or place work on a firm surface when using a screwdriver. Work held in the hand often results in injury if the tool slips.

DON'T hold work in your hand, when using a screwdriver on it. Do not place the work on an unstable surface or any place that might permit it to slip.

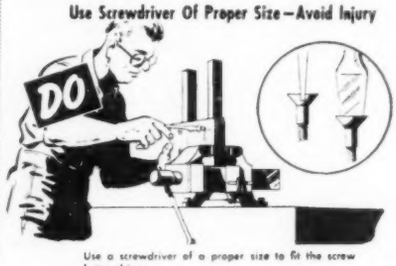
Use Proper Type Of Screwdriver—Avoid Injury



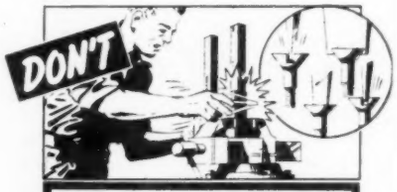
Use screwdriver of proper design for work on hand. Screwdrivers come in many styles, each for a certain kind of job — standard, offset, cross-slot type, square shank, ratchet, etc.

DON'T use wrong type of screwdriver on work requiring another type. Injury can be avoided by taking the trouble to get the proper type of tool.

Use Screwdriver Of Proper Size—Avoid Injury



Use a screwdriver of a proper size to fit the screw being driven.



DON'T use a screwdriver with a blade too thick, too thin, or too wide to fit the screw slot correctly, as the blade may slip out and cause injury.

I WOULDN'T TOUCH HIM WITH A TEN FOOT POLE!
LET'S SEE—OH, HERE IT IS— "PERSONS SUFFERING FROM SHOCK..."
IF THERE'S VITAMINS IN JUICE— HE'S LOADED!
ANYHOW, THAT'S THE BRIGHTEST HE'S EVER LOOKED!
I THINK HE SHOULDA CALLED AN ELECTRICIAN!
WALT DITZEN
NATIONAL SAFETY COUNCIL

Use Screwdrivers For What They Were Intended—Avoid Injury

Use a screwdriver only for driving or removing screws. It is not designed for other types of work.

DON'T use a screwdriver for a lever, chisel, or punch. Don't strike the handle of a screwdriver with another tool, the handle may chip or split and cause personal injury, or damage to the tool.

"How To Do It" Suggestions

By Myrle Shafer

Prepayment Type of Instrument Circuit

THE CIRCUIT of the prepayment type of common battery instrument is not well known, as many of the Independents do not use this mode of operation on pay stations. A typical prepay circuit is given in Fig. 1. When a coin (usually 5c) is deposited in the slot it causes a set of contacts to close and permits signaling the operator in a manual system or enables dialing in an automatic system. The coin relay is under control of the operator and she can either cause it to return the coin to the subscriber or to be deposited in the coin box, depending on the polarity of the current flowing towards the subset. A special key permits the operator to reverse the current. This is accomplished automatically by special equipment in a dial exchange.

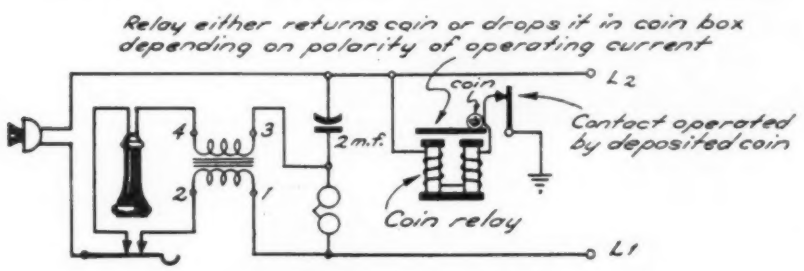


Figure 1. Prepay Circuit.

• • •

Use Screwdrivers and Wrenches Properly

SCREWDRIVERS suffer probably more than any other **hand tool** from neglect. They are used as pinch bars, chisels, punches, etc. The screwdriver blade is allowed to become chisel shaped, broken, bent and consequently fails to give good results when used on screws. The tip of the blade should be squared off and with the blade held on a flat surface a fine cut file should be used to file the two faces of the blade to a flat surface. The thickness of the blade edge will be determined by the size of the screwdriver and in general should be such that it fully fills the screw slot. Fig. 2 shows the proper method of using and maintaining a screw driver.

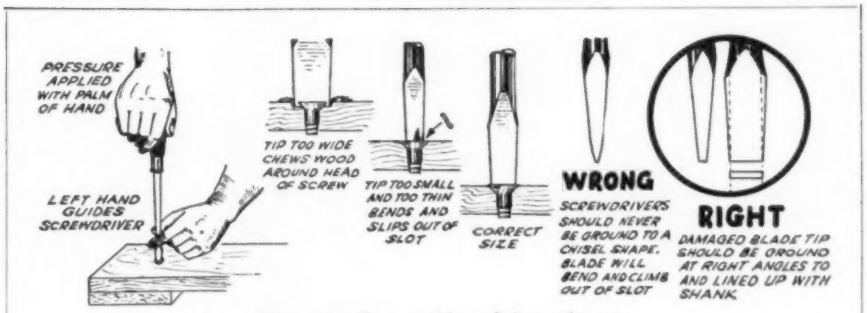

PRESSURE APPLIED WITH PALM OF HAND
LEFT HAND GUIDES SCREWDRIVER
TIP TOO WIDE CHEWS WOOD AROUND HEAD OF SCREW
TIP TOO SMALL AND TOO THIN BENDS AND SLIPS OUT OF SLOT
CORRECT SIZE
WRONG
SCREWDRIVERS SHOULD NEVER BE GROUND TO A CHISEL SHAPE. BLADE WILL BEND AND CLIMB OUT OF SLOT
RIGHT
DAMAGED BLADE TIP SHOULD BE GROUND AT RIGHT ANGLES TO AND LINED UP WITH SHANK

Figure 2. Correct Use of Screwdrivers.

Like screwdrivers, wrenches come in for much abuse. They also need occasional maintenance. The jaws of the popular "Crescent type" wrench should be removed occasionally and brushed off with a wire brush, replaced and carefully oiled. Wrenches should not be used as hammers. This tends to burr up the edges and may cause the jaws to work hard. Two common errors occur in the use of crescent wrenches. One is to turn it the wrong direction, and the other, to fail to screw the jaws down tight so they fit snugly around the nut.

• • •

Sands Bimetallic Arrestor Block

AN ARRESTOR block that offers some advantages similar to those of the protector relay, though not as fast in operation, is the well known Sand's arrestor block shown in Fig. 3. The temporary shorting action in the Sand's block is due to the bimetallic strip which consists of two unlike metals. The heat of discharge and the unequal expansion characteristics of the two metals causes the metal strip to bend down and short out the block. After the discharge current has ceased, the bi-metallic strip assumes its original position and removes the short.

• • •

Pole Line Picture Records

TELEPHONE companies have found that a pictorial record of the configuration and circuit identification on the various toll and rural leads

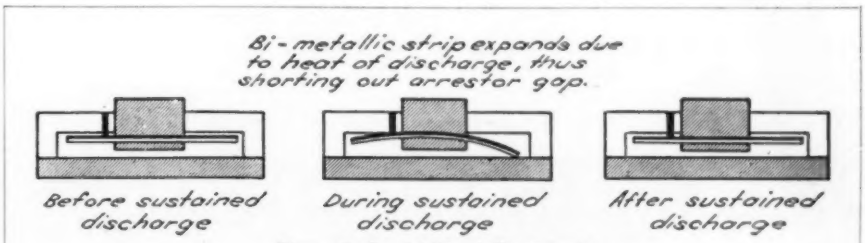

Bi-metallic strip expands due to heat of discharge, thus shorting out arrestor gap.
Before sustained discharge
During sustained discharge
After sustained discharge

Figure 3. Sands' Bimetallic Arrestor.

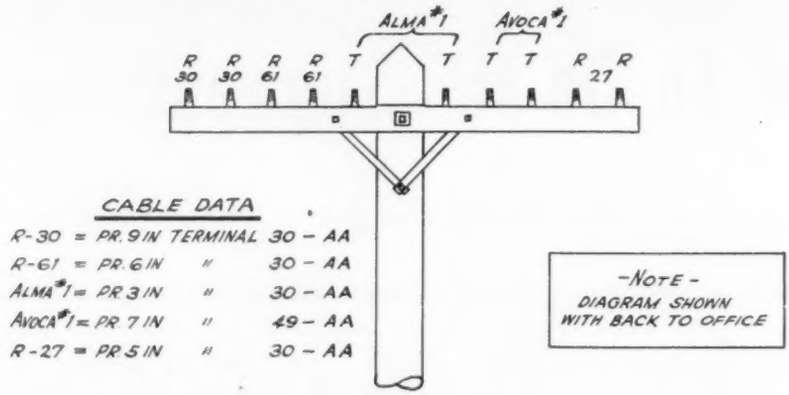


Figure 4. Pole Line Record Card.

feeding out over various routes from an exchange is very helpful to trouble shooters. This record can be kept on 5 x 7 cards, duplicate copies being carried in each of the trouble shooters cars. A typical card is shown in Fig. 4.

• • •

ALUMINUM IN THE LIMELIGHT . . .

FOR MANY years aluminum was primarily used for kitchen ware and commonly believed to be of little value as a general substitute for steel and other metals. The wide use of aluminum alloys for military purposes during the last war has definitely brought aluminum out of the kitchen and into the industrial field. Its outstanding advantage, as compared to steel, is its light weight and strength.

Typical of the many new uses being found for air craft aluminum alloys in the telephone and power fields is its application for truck mounted aerial ladders. The aerial ladder is a new tool finding many applications in the telephone and power fields. It offers the distinct advantage of reducing the amount of labor time required on inspection and minor repair work. It prevents the "cutting up" of terminal poles by linesman's climbers.

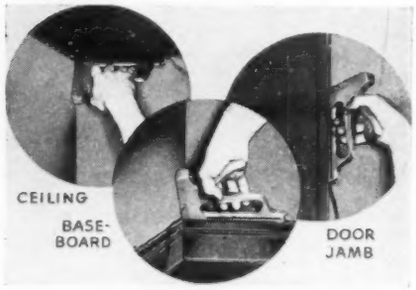
A new type aerial ladder engineered by an eastern telephone and telegraph company is of the telescoping type and is so balanced that the matter of raising it to a working position, on top of the truck body is simple, almost effortless operation. The total weight of this ladder is only 285 lbs.

It has proven particularly valuable to telephone companies for inspection and minor repair work on telephone cable. Techniques have been worked out whereby the linemen can stay in the "crow's nest" while the truck is driven slowly along the cable line, thus permitting operations as if the cable were at ground level. An outstanding advantage claimed for this ladder is the fact that the entire truck body can be used for storage because of the unique manner in which the ladder unit is mounted on the truck.

• • •

AUTOMATIC STAPLING GUN PROVES IN . . .

A NEW TYPE stapling gun has been tested, approved and is now being used for low tension wire by the Bell System. The gun will automatically staple braided, rubber coated, single and double strand wire and hollow tube lines to baseboards, plaster walls, window frames, door jambs, rafters and around difficult angles or corners.



Automatic Stapling Gun. Does not mar or injure the wire; drives as easy in hard wood as in soft wood.

This Gun uses a new type of staple with a better holding and easier driving point. It has been tested and approved as the finest and most efficient driving point for its purpose by the A. T. & T. Laboratories. The staple will drive as easily in hard as in soft woods. (Tested to hold in hard woods 56 to 64 lbs. and in softer woods 28 to 34 lbs.)

KLEIN PLIERS!

STAY KEEN . . . SAVE COSTS

Linemen know they can depend upon the quality and performance of Klein pliers. Drop forged from the finest alloy steel, each pair is individually tempered and tested—just the right spring to the handles to minimize fatigue. Fitted hinge keeps jaws perfectly aligned. Carefully matched blades cut swiftly, surely, stay keen for years—save costs.

RECOMMENDED AND DISTRIBUTED BY

AUTOMATIC ELECTRIC SALES CORPORATION

1033 W. Van Buren Street Chicago 7, Illinois

Barber-Greene

720 Ditcher

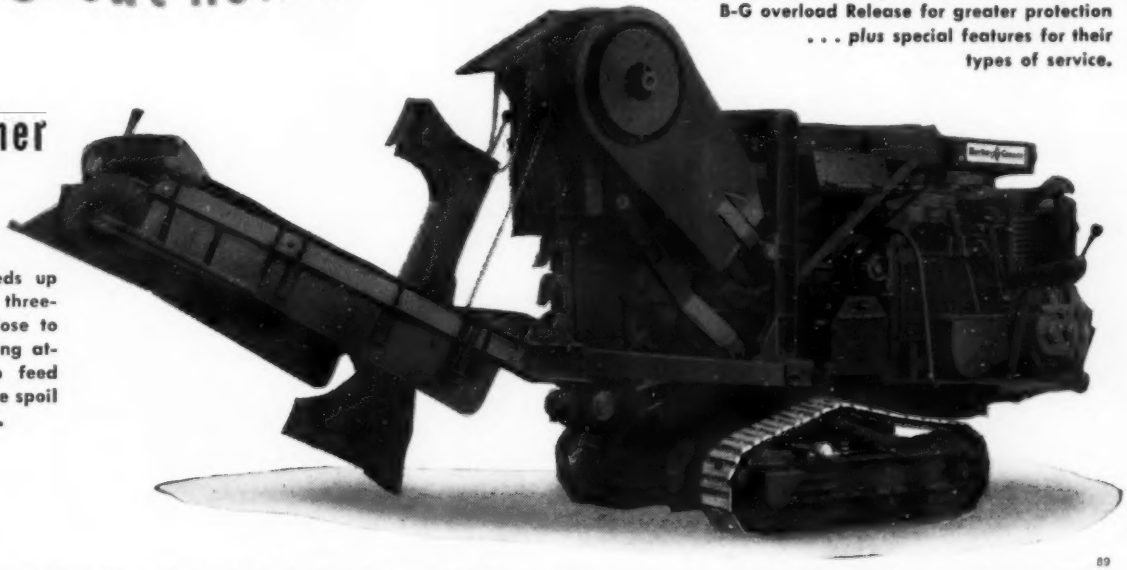
For digging trenches 8" to 11" wide—up to 4 feet in depth. Digging speeds up to 32 F.P.M.; traveling speeds as high as 234 F.P.M. adjustable spoils conveyor discharges on either side. Three-position boom adjustable to dig close to obstructions. Simple B-G controls, easy-steering.

Two great new ditchers in the B.G. line!

These two new ditchers bring exclusive, time-proved B-G advantages . . . the B-G Vertical Boom that digs straight down, leaves no ramp . . . close-spaced, self-cleaning buckets that cut, like a milling machine, into toughest ground . . . the patented B-G overload Release for greater protection . . . *plus* special features for their types of service.

710 Ditcher

Digs trenches 5½" wide up to 42" deep. Digging speeds up to 32 F.P.M.; travel speeds up to 234 F.P.M. Vertical three-position boom digs close to obstructions. Cable-laying attachment available to feed cable and plow over the spoil in one continuous pass.



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Ask your Barber-Greene distributor for full details on the B-G Ditcher which interests you — or write to Barber-Greene Company, Aurora, Illinois.

BARBER · GREENE COMPANY · AURORA, ILLINOIS

Constant flow Equipment

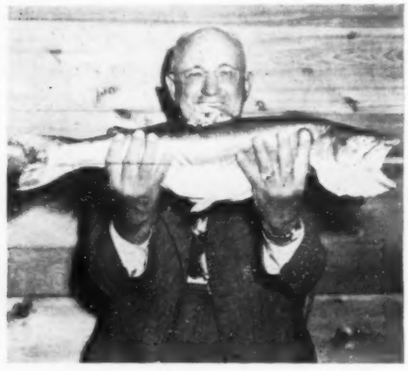
LOADERS · PERMANENT CONVEYORS · PORTABLE CONVEYORS · COAL MACHINES · BITUMINOUS PLANTS · FINISHERS · DITCHERS

H. V. BOZELL, *left, president General Tel. Corp.*, MRS. M. F. LACROIX, MRS. H. V. BOZELL, M. F. LACROIX, *chairman of the Board of General Telephone*, MRS. C. E. JOHNSTON, *and* C. E. JOHNSTON, *president and general manager Interstate Telephone Co., photographed during recent meeting at Hayden Lake, Idaho.*

Pictured here is WALTER DAKIN, *president Commonwealth Tel. Co., Madison, Wisc., and* "DOC" FAIRLY, *Lubbock, Texas, during recent meeting in Idaho.*

CLEO F. CRAIG
". . . placed in charge of AT&T's dept. of operation and engineering.

W. C. BOLENIUS
". . . elected AT&T v. p. in charge of personnel relations."

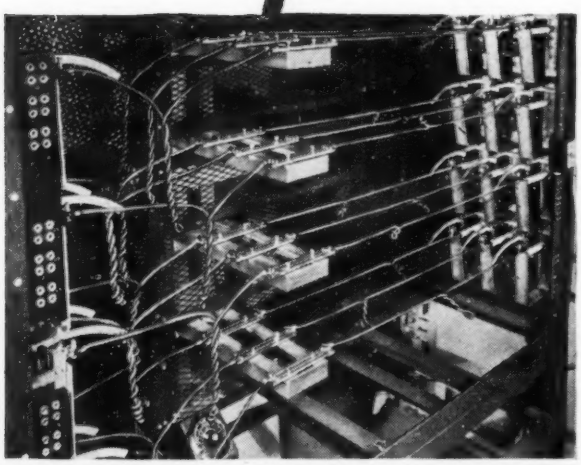


R. B. (DOC) FAIRLY, *Lubbock, Texas exhibits a 10½-lb. Kamloops trout caught at Pend O'Reille Lodge, Sandpoint, Idaho.*

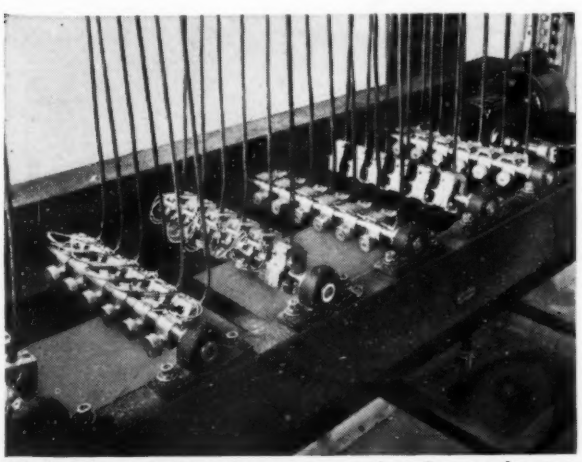
H. L. WILLIAMSON
". . . appointed general plant supt., Eastern Group Operating Companies of General Tel. System."

BOB HEDRICK, FOSTER MCHENRY, RAY SMITH, *and* LLOYD D. SPENCER *(on left) are waiting for some of* MRS. RAY SMITH'S *birthday cake;* MRS. MCHENRY *(right) is the umpire. Party for* MRS. SMITH *at Kansas Convention was given by* MRS. MCHENRY, MRS. B. C. BURDEN *and* MRS. HEDRICK.

It has to be tough!



This machine pulls out the kinks in telephone cords harder than needed to pull a combined set off a desk. Cords withstand from 70,000 to 100,000 pulls. (More than they would get in over 20 years' normal service.)



This bending test determines wear at point where cord enters handset handle. In 24 hours a cord can be given wear equivalent to more than 10 years of normal subscriber usage.

TELEPHONE cords are subject to constant pulling, hauling and twisting . . . yet they seem to last forever! This long life prevents costly service calls, maintains subscriber good will.

Bell Telephone Laboratories scientists, through constant research and testing, have done much to lengthen the life of the cords manufactured by Western Electric.

Two of the exacting tests to which all new cord types are subjected are shown here. Another test simulates the abrasion of a cord sliding over the edge of an oak desk. Still others check the electrical characteristics of the cords under varying degrees of humidity and temperature.

That's why you can expect Western Electric cords to have a long life, and a useful one.

Western Electric

TELEPHONE APPARATUS AND CABLE

GREAT CITIES OF THE WORLD RELY ON

Lisbon has always been famed for its fine situation as its earlier names prove, one of them, for example, meaning "the friendly bay." Romantic stories describe its origin; one says that Lisbon was founded by Ulysses whilst another tells of two ravens who guided there the ship of Saint Vincent, the Patron Saint of Lisbon, whose tomb stands in the Cathedral. From the wide waters of the Tagus, "in which all the navies of the world might anchor" Vasco da Gama set sail on his voyage of discovery to India round the Cape of Good Hope, a fact commemorated by the erection of the beautiful Convent of Jeronymos, now one of the architectural gems of the world. In the Tagus, too, gathered that mighty invasion fleet which soon after belied its title of the "Invincible Armada." Risen phoenix-like from the ashes of the earthquake of 1755, Lisbon is today a fine city of wide Avenues and open Squares.

STROWGER TELECOMMUNICATIONS

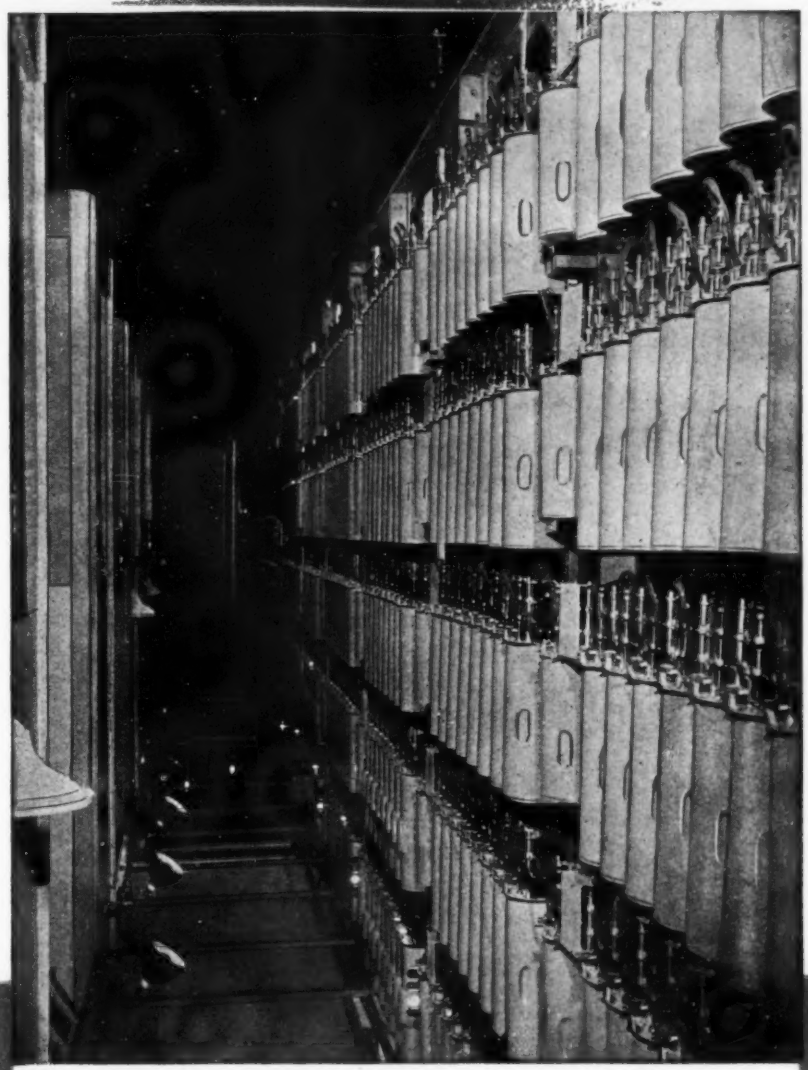


Photo : Final Selector Rack, Lisbon Exchange

The placing into service of the Norte Automatic Telephone Exchange in 1934 marked the completion of an advanced stage in the conversion to full automatic working of Lisbon's extensive Telephone network. Norte had an initial capacity of 8,800 lines and served the mainly residential area of the network owned and operated by the Anglo Portuguese Telephone Company; it has since been extended and 13,200 lines are now either in service or in process of installation, both subscriber and coin-box lines being provided.

The Strowger equipment supplied consists of single two-step line and cut-off relays and 200-point line finders operating on the partial secondary trunking system.

Estrella Exchange, employing Strowger type 32A (B.P.O. 2,000) selectors, was subsequently installed with 7,400 lines now operating or under installation, and has been followed by Trindade Second Unit with 3,400 lines and Campo Pequeno with 5,500 lines.

Strowger engineers have now in hand preparations for the supply of 1,800 lines for Belem Exchange. Progress will not cease there, for Lisbon is fully aware of the merits of Strowger Automatic Telephony and has long practical experience of its benefits.

★

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.

★

NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2.
Temple Bar 9262. Cables: Autelco, London.
STROWGER WORKS, LIVERPOOL, 7, ENGLAND.

ATM
REG'D TRADE MARK

A7343-A23

Telephone News Briefs

GENERAL TELEPHONE MEETING AT HAYDEN LAKE, IDAHO
Standing (L to R) WALTER DAKIN, *Madison, Wisc.;* EDW. BLAKESLEE, *Santa Monica, Calif.;* C. H. MCKENZIE, *Erie Pa.; seated (L to R)* ROY AUTRY *and* R. B. FAIRLY, *Lubbock, Texas, and* L. F. SHEPHERD, *LaFayette, Ind., listen to* C. E. JOHNSTON, *of Interstate Telephone Co. tell a North Idaho fish story.*

• NATIONAL •

Mobile Service Triples in 2nd Year

Passing its second milestone in June, Bell System mobile telephone service discovered that while it is twice as old as it was a year ago, it has grown just about three times as big.

Mobile telephone service has traveled a long way since its inaugural at St. Louis in June, 1946. By the end of its first 12 months, more than 1,400 automobiles, trucks, buses, taxis, switch engines and boats were placing and receiving about 10,000 telephone calls a week in 39 American cities and towns.

Since then, business has just about tripled. Today nearly 5,000 vehicles of all types, including fast passenger trains and harbor craft, are handling 30,000 calls a week through mobile systems established in nearly 100 different cities and towns. In addition, service is now scheduled for about 50 other localities. While the record to date is impressive, it is only a step toward what may be expected when sufficient radio channels become available—judging from the present large waiting lists.

Rural Telephone Survey

A rural telephone survey is currently being conducted by the Agricultural Economics department of Purdue university. The purpose of the survey is to determine some of the most important problems in connection with rural telephone service in Indiana as a basis for an extension program to disseminate information to others interested in the problem.

The department stated that farmers' needs for telephone service are increasing with the increased commercialization of agriculture, the increased business contacts between farmers and service and marketing agencies and the increased premium on human labor.

Britons Wait for Service

A half million Britons still are patiently waiting for telephones. This is a big jump from the pre-war waiting list of just over 5,000.

Many applicants have been cooling their heels since March, 1946. The General Post Office, proprieter of the nation's telephone system, blames the delay on manpower and material shortages which have been plaguing it since war's end. In addition, large quantities of telephone equipment have been shipped abroad as part of Britain's export drive.

Small Company Accounting

The Kentucky Public Service Commission through James M. Hunaker, has offered to render assistance to Class D telephone companies (having gross operating revenues of less than $25,000.00 a year) in setting up their bookkeeping and accounting systems. The commission has devised a simplified method for class D companies to use in making annual reports. The Kentucky Independent Telephone Association has commended the commission for making this service available, and recommended that members ask for assistance when needed.

Recorder Signal "Beeps" In . . .

Telephone companies—which already have good collections of sound effects, including the buzz, buzz of the "busy signal", the steady hum of the "dial tone" and the howl of the "receiver-off-the-hook"—added a new note to the assortment August 2. This time it's a brief, high, almost musical note—a sort of gentle "beep" that means the person to whom you are talking is making a recording of the conversation.

The use of voice recording machines to make a record of a telephone conversation became legal August 2, following several years of study by the Federal Communications Commission and the sanctioning of their use by the FCC which decided telephone recorders could be used providing a warning signal is heard whenever a recording machine is attached to a telephone line.

Reprint of Industry Pamphlet

A reprint of the United States Independent Telephone Association pamphlet, "The Independent Telephone

TABLE I—TELEPHONE STATISTICS

The following statistical information indicates the size of the Independent telephone industry as a whole and as compared with the Bell System; the figures are as of the end of the year 1947. (Courtesy of United States Independent Telephone Association).

	Total for United States	Bell System	Independent
Total telephones	34,867,000	28,507,000	6,360,000
Number of operating companies	5,871	21	5,850*
Number of central offices	18,862	7,727	11,135
Investment in telephone plant	$8,200,000,000	$7,349,000,000	$851,000,000
Gross revenues	$2,470,000,000	$2,225,000,000	$245,000,000
Number of employees	611,000	524,000	87,000

* In addition there are more than 60,000 connecting rural lines, mostly owned mutually by groups of farmers.

Industry in the United States," dated August 1, recently was forwarded to each member company. The pamphlet is designed to meet requests for information concerning the general scope of the Independent branch of the telephone industry. The present reprint reflects several editorial changes as well as changes in the table of statistics (see Table I). For the first time the pamphlet contains information showing the distribution of Independent telephone companies by states (see Table II).

The total number of Independent telephones at the end of 1947 was 6,360,000, compared with 28,507,000 for the Bell System. Investment in telephone plant by Independent companies aggregated $851 million, compared with $7 billion, 349 million, for the Bell System. Gross revenues of Independent companies aggregated $245 million, compared with $2 billion, 225 million, for the Bell System. Independent company employees numbered 87,000, compared with 524,000 for the Bell System.

MISSOURI: 4 District Meetings

District Meetings for Missouri Telephone Association have been scheduled as follows: Macon, September 21, Rollo, September 22, Springfield, September 23, and Warrensburg, September 24.

Aerial Cable Patrol

Aerial patrol of the Bell System's buried transcontinental telephone cable between Omaha and Cheyenne was recently inaugurated. Purpose of the patrol is to observe any activities near or approaching the buried cable, which might cause an interruption of service over hundreds of circuits joining the east and west coasts. Particular attention is paid to terracing plowing or irrigation ditches, road construction work, fencing operations and other general construction which might result in trouble to the cable.

O. B. Hefley, president of the Aero Patrol and Service, Inc., of Oklahoma City, Okla., has contracted with the Long Lines department of the American Telephone and Telegraph Company for two flights each week, Omaha to Cheyenne on Monday and Cheyenne to Omaha on Thursday, for a trial period of 22 weeks ending early in December.

Flights will be made at a speed of about 80 miles an hour at not much more than 200 feet altitude. This permits the pilot to observe action along the route of the cable and in case of activity by other than telephone company construction crews, he "buzzes" the individuals and drops a message

TABLE II—NUMBER OF INDEPENDENT TELEPHONES IN UNITED STATES DISTRIBUTION BY STATES: DECEMBER 31, 1947

(Courtesy of United States Independent Telephone Association)

Alabama	31,800	Maine	21,100	Oklahoma	75,100
Arizona	4,400	Maryland	8,100	Oregon	65,300
Arkansas	41,000	Massachusetts	2,900	Pennsylvania	347,700
California	397,000	Michigan	160,100	Rhode Island	6,600
Colorado	14,300	Minnesota	203,200	South Carolina	34,200
Connecticut	648,100*	Mississippi	5,600	South Dakota	52,000
Delaware	0	Missouri	250,000	Tennessee	65,200
District of Columbia	1,300	Montana	13,900	Texas	243,800
Florida	143,600	Nebraska	198,000	Utah	7,000
Georgia	42,200	Nevada	16,500	Vermont	11,500
Idaho	26,200	New Hampshire	7,100	Virginia	94,600
Illinois	423,800	New Jersey	18,700	Washington	116,100
Indiana	402,700	New Mexico	9,200	West Virginia	36,700
Iowa	298,700	New York	325,000	Wisconsin	246,500
Kansas	162,000	North Carolina	158,900	Wyoming	6,800
Kentucky	131,400*	North Dakota	44,400		
Louisiana	11,400	Ohio	728,300*	UNITED STATES	6,360,000

*Includes telephones of The Cincinnati and Suburban Bell Telephone Company and The Southern New England Telephone Company.

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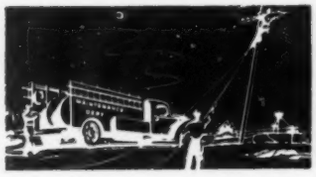
2. Withstands heavier ice and wind loads.

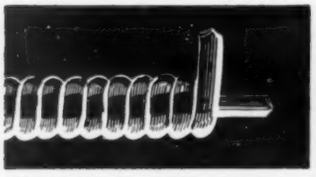
3. Makes longer spans possible.

4. Lowers construction cost — only half the poles needed.



5. Lower maintenance costs—greater strength means fewer breaks.

6. Has greater transmission efficiency at voice frequencies.



7. Special galvanizing means longer life.

8. U·S·S American Armor Rods reduce vibration — prevent breaks.

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advising them of the location and of the potential trouble. The long lines department of the A. T. & T. company has regular section men covering the 80-mile stretches of the cable.

The pilot is able to determine if work being done on the ground is by the telephone company, as he is advised of jobs in progress before each flight. Also, all of the department's maintenance trucks have an identification mark painted on top of the cab. If there is no truck at the scene of the project and the work is being supervised by a telephone company representative identification mark is placed at the scene.

General Tel. Board Meeting

Directors of General Telephone Corporation and General Telephone Service Corporation recently held their third quarterly Board meeting at Pend Oreille Lake and Hayden Lake, Idaho. This is the first time that these two groups have met in the Pacific Northwest where the Interstate Telephone Company, an affiliated company, operates 48 exchanges. While in the area they were guests of Interstate Telephone Company, of which C. E. Johnston is president and general manager.

It is the policy of the General Telephone Corporation to become acquainted with the areas in which they have operating companies. The unprecedented growth and expansion in the Pacific Northwest was the primary reason for the visit in order that the group could see at first-hand the opportunities that lie just ahead in the telephone industry. Side trips were taken through Northern Idaho; to the wheat and pea raising section known as the Palouse Country, centering around Moscow, Idaho and Pullman, Washington; to the fruit area in Central Washington centering around Wenatchee; to the grain and live stock raising area of Eastern Washington; and through the vast Columbia Basin project at Coulee Dam and its attendant irrigation development, which will eventually irrigate over a million arid acres.

Rust Brothers Retire

After almost 50 years in the telephone business John Y. Rust resigned as president of the San Angelo (Texas) Telephone Company and Lew Rust resigned as president and general manager of the Del Rio and Wintergarden (Texas) Telephone Company effective August 1.

In announcing their retirement as active heads of their companies the Rust brothers stated that they would be succeeded in office by Don Hunsaker of Dallas who for many years has been a close friend and business associate. Hunsaker has resigned as connecting company agent of the Southwestern Bell Telephone Company. J. C. Paxton has been appointed acting connecting company agent.

DON HUNSAKER

". . . succeeds Rust brothers as pres. of San Angelo Tel. Co. & Del Rio & Wintergarden Tel. Co."

The Rust brothers are real telephone pioneers with interesting and colorful backgrounds in the business. Both started their telephone careers in Philadelphia in the "90's." "JY" came to San Angelo, Texas, and started in the telephone business for himself in 1898. Brother Lew followed him to San Angelo in 1900 and they worked together building lines and extending service throughout that region for five years. In 1905 Lew Rust bought the little company at Del Rio and moved to that city. "JY" continued to develop the San Angelo territory and his company today serves 19 communities. Lew Rust also branched out from Del Rio and his company today serves 22 communities.

The Rust brothers have seen their cities and territories grow from open ranch country to important cities surrounded by well organized ranches on many of which oil has been discovered. While the first love of the Rust brothers has been the telephone business, both have taken parts in ranching, financial and civic activities in their sections of the state. In addition, they have been boosters and builders of the areas they have served.

Hunsaker has been in the telephone business for 34 years, having started his career with the Chicago Telephone Company in 1909. He went to Texas in 1916 to work for the Mountain States Telephone and Telegraph Company at El Paso.

After serving as manager at Santa Fe, Mr. Hunsaker joined the Southwestern Bell at Fort Worth. He became district manager at Fort Worth and district superintendent at Amarillo before being promoted to the general offices of the company at Dallas in 1934. He is well known to Independent telephone people throughout the nation.

Paxton, who succeeds Hunsaker as acting connecting company agent at Dallas, also is well known to Independent operators. He has been in the telephone business for over 30 years, including service with the Northern Texas Telephone Company and the Rio Grande Valley Telephone Company. He served with the Army of Occupation in Europe and attained the rank of Lt. Colonel. He returned to civilian life last December.

Telephone Rates Lag Below Cost of Living Increases

Up-to-date cost of living figures issued by the United States Bureau of Labor Statistics emphasizes again that telephone rates have gone up only a small fraction of the rise in other living cost factors today.

As an example, the Bureau's index shows a total increase of about 70 per cent since 1939 while the telephone portion shows an increase of only 21 per cent. Since three-quarters of this increase is due principally to the Federal excise or other taxes, the actual increase in cost of local resident service for the country as a whole is only 5 per cent.

Argo, Ia., Company Sold

After operating the Argo (Ia.) Mutual Telephone Co. for the past two years, Henry Paaske recently purchased the company's property and equipment for $2,000. The system serves 120 subscribers; was formerly operated as the Mutual Telephone Co. by W. K. Paul.

EXPANSION & IMPROVEMENTS

Superior, Mont., Cutover Completed

A new automatic telephone system was recently cut in operation by the Superior (Mont.) Electric Light & Water Works Co., after many months of delay pending arrival of equipment.

Equipment for the new system was first ordered in July, 1946. At that time it was estimated that a 30-line-capacity board equipped with 20 lines

"But, of course, the plumbing is automatic. You carry the water up-hill and it runs down ALL BY ITSELF!"

would be sufficient to handle requirements. Since then, however, it has been necessary to revise the order twice, increasing the capacity of the board to 200 lines of which 60 lines are in use now, with an additional 10-line section on order.

Work first started on installing the system about a year ago, when the first shipment of material was made. Since then over 2,450 feet of 25-pair cable, 1,800 feet of 50-pair cable and 575 feet of 75-pair cable, totalling 4,825 feet, plus a like amount of messenger, has been strung. In addition to this, about 24,000 feet of drop wire, 19 miles of open wire, and numerous other materials have gone into the system.

$28,675 Expansion Program

Installation of four new switchboard positions at the Portland, Ind. office of the United Telephone Co., Inc., has been completed and manager Ralph S. Shoemaker has announced that the exchange now has a total of nine switchboards.

The installation was done at a total cost of $28,675 and resulted in the employment of four additional operators which will facilitate the handling of calls over the Portland exchange.

Oakland, Iowa, Cutover

The Oakland, Iowa exchange of the Western Light & Telephone Co. recently was cutover from magneto to common battery.

More than 50 invited guests and company officials were in the new telephone building when the new system was inaugurated.

Among those present at the proceedings were: Arthur L. Mullergren, president of the Western Light & Telephone Co.; A. J. Harty, general manager; F. M. Brown, advisory engineer; E. R. Luckett, plant superintendent; William Heither, installer, and John Rahija, installer's assistant. Others present included Jim Trevillian, representative of the Kellogg Switchboard & Supply Co.; O. E. Elwell, manager of the Denison district, and L. V. Hale of Corning, manager of the district in which the Oakland office is located.

Cowen, W. Va., Changeover

Webster Springs (W. Va.) Telephone Company is rapidly progressing with the changeover of the Cowen exchange to automatic operation. H. H. O'Neal, manager, says the equipment being installed at a cost of approximately $25,000.00 will be ready for use this month.

The number of telephones served by the Webster Springs Telephone Company at Webster Springs and Cowen has increased rapidly in recent years. Mr. O'Neal pointed out that ten years ago there were 54 telephones in the plant, today there are over 700.

Marshall, Ill., Adds Equipment

Recent telephone equipment additions within the Marshall, Ill. central office of the Illinois Telephone Company increase exchange capacity by more than 20%. This is the initial step in providing facilities for a large number of applicants awaiting telephone service.

The company is planning and engineering additional projects to augment the present toll and rural switch-

(Please turn to page 71)

STROMBERG-

there's very little else to be said!

Kennecott Telephone Cable literally criss-crosses the country—and any inch of it, found in a busy metropolis or an open field, will test to the same high quality! Years of experience—rigid standards of manufacture—critical testing before shipment—these explain the continuing popularity of this brand.

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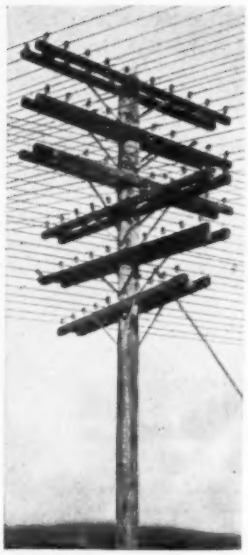

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. . . all that the name implies

Cross-Arms made of a uniform grade and expert workmanship by American Cross-Arm, Inc., are available in three types of wood to meet your individual preference:

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This single circuit protector, equipped with fuses and lightning arresters, is unexcelled for either indoor or outdoor use. Special Cook-engineered features include:

1. Heavy white glazed porcelain designed to prevent surface leakage between current-carrying parts.
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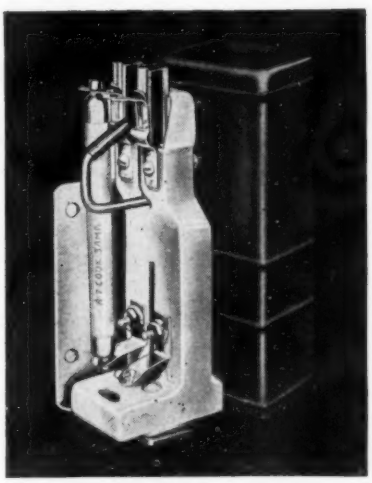
4. Choice of types and lengths of Cook Telephone Fuses.



subscriber service improves with the

sturgis high-standard

Calm, unruffled subscriber service prevails when operators are mentally and physically well-poised.

The Sturgis No. 635-FF is aptly titled the High-Standard. Its full saddle seat (15¼" by 16¾") is the last word in comfort. Its form-fitting backrest (7" by 13") has the ingenious new Firm-Flex feature, which means that it *gives* to every body movement, furnishing uninterrupted support while the operator turns, bends or leans backward. Three-way adjustment in height and depth provides correct posture for operators of every type of figure.

1" tubular steel, welded throughout, makes the frame indestructible. The hair-filled genuine leather upholstery is equally long-wearing.

Your company, your operators and your subscribers will profit from your selection of Sturgis chairs.

Seat Heights—Adjustable

18" to 22"	24" to 28"
20" to 24"	26" to 30"
22" to 26"	28" to 32"

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Cat. No. SB-91—With cover, for outdoor use—7 amp. fiber fuses.
Cat. No. SB-88—Without cover, for indoor use—7 amp. fiber fuses.
Other fuses available to order.

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Non-porous, non-deteriorating, uniform coefficient of expansion and high mechanical as well as high dielectric strength are some of the many qualities that rank Hemingray the "best on the line."

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Commercial Cord
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26 East Main Street
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*Order by Code Number or Submit Sample

board, and to rehabilitate the rural lines out from Marshall.

Within the next 30 days, the company will arrange for the addition of two direct toll circuits to Champaign. This will expedite long distance calls north from Marshall, which previously were switched at Paris and Terre Haute.

The equipment costs and toll work will amount to an expenditure of approximately $10,000.00.

Versailles, Ohio, Expands

Officials of the Ohio Telephone Service Company have announced that the company has completed installation of three additional toll and free service lines between Versailles and Greenville, Ohio, exchanges. The additional lines, were installed to facilitate the handling of the increased number of calls between the two exchanges.

H. F. Clapper, district manager of the company's Darke County area also stated that progress was being made in connection with the company's proposed plans for the construction of a new telephone building in Versailles, and the establishment of automatic service for town and rural subscribers.

$50,000 Project For Pontiac

Telephone equipment additions within the Pontiac, Ill., central office of the Illinois Telephone Company have increased capacity of the exchange by eight to 10 per cent, according to announcement by Nyle Scholl, manager.

This is the initial step in providing facilities for a considerable number of applicants awaiting telephone service, he said. Also in progress are outside cable projects which will complete construction necessary to handle most of the present applications by late fall. Total cable and central office construction projects will approximate $50,000.

California, Mo., Cutover

The new common battery telephone system for the California, Mo. exchange of the United Telephone Co. has been placed in operation, according to announcement made by J. J. Brant of Tipton, district manager for the United company.

Ohio Associated Plans Improvements

Dial telephones are to be in use by 1950 in several Montgomery (Ohio) county rural communities.

Officials of the Ohio Associated Telephone Co. revealed during a recent hearing before the Ohio Public Utilities Commission that the company estimated it would spend $1,859,975 on an improvement program from 1948 to 1953.

According to the report, the company will spend $90,150 on the conversion program for Englewood, $67,650 at Liberty and $171,050 at Trotwood.

The conversion and construction budget concerns 16 communities for the six year period.

Other communities to change to the dial system will be Farmersville, by 1953; Gratis, 1953; Lewisburg, 1949; Morning Sun, 1951; New Lebanon, 1953; Oxford, 1951; and West Alexandria, 1953.

Improvements are also planned for College Corner, Brookville, Laura, Phillipsburg and W. Milton.

Lakeville Starts Dialing

Three hundred fifty-two Central Telephone Company subscribers in the Lakeville, Wis., area recently watched new-

USITA Asks First Consideration On Mobile Frequencies Be Given To Telephone Companies

THE UNITED STATES Independent Telephone Association, in entering its second protest against FCC proposals for the fixed mobile radio services, declared in a statement presented by former Commissioner Norman S. Case, USITA attorney, that the association "strongly feels that these assignments are woefully inadequate to permit common carrier telephone companies to carry out the responsibility of rendering adequate and efficient service in the field of Domestic Public Mobile Radiotelephone Service."

USITA stressed that under the present proposals, "instead of allocating all of the available frequencies to a broad general service" the Commission "is providing three special user categories having access to three different groups of frequencies, namely the Industrial, Land Transportation and Public Radio, which are in addition to the Public Safety and Maritime Mobile Services." The association stated it realizes "there may be special circumstances which might warrant the allocation of specific radio frequencies to other than telephone company common carrier applications" but that the USITA is compelled "to emphasize again that where there is an insufficiency of frequencies to be assigned for mobile service, first consideration should be given to assigning the available frequencies to telephone companies which serve all the public." The history of the telephone industry, it was stressed, "has demonstrated that telephone companies have recognized the special needs of some groups of users and have established special classes of service whenever needed and where facilities were available."

"In addition it must be pointed out that the telephone companies are the only agencies that can render service to the many small users, each of which may operate only a few cars and is insufficient in size to operate a separate system," the association stated. Stressed also by USITA was that "only the telephone companies provide service to the many rural locations where the use of these VHF frequencies seems to provide the only proper way to render telephone service."

The USITA argued that "telephone companies should have frequencies assigned exclusively for their use in serving the public because, otherwise it will be impossible for them to do the long range planning needed for efficient growth." Such frequencies, the USITA continued, should be made available in such a way "that they can be used either in general service mobile systems, in limited service mobile systems, for toll circuits or for rural service, as specific local needs dictate."

The USITA cited frequency needs of the Independent telephone industry, based on analyses made by a number of companies, as 80 additional frequencies or 20 usable alternate channels and requested that the FCC make these available in the 152-162 mc band, leaving the proposed assignment in the 30-40 mc region unaltered.

The USITA then noted that it may be the Commission's intention to require interconnection with base stations of Land Transportation and Industrial Radio Services. The association requested that "no rules or regulations be promulgated which make mandatory the interconnection of the wire facilities of telephone companies with radio facilities not operated by them," emphasizing that under the Communications Act such connections are required only with common carriers. The Land Transportation and Industrial Services are not common carriers under the definition of the Act, the USITA contended.

type automatic telephones replace the hand crank and local operator system.

In the Central Telephone company's two-state district which serves 26 Minnesota and South Dakota towns, Lakeville is the fourth town to receive automatic telephones.

Alaska Boosts Allotment

The Alaska Communications System, which has just celebrated its 48th anniversary, plans an expenditure of $2.5 million for civil communications during next fiscal year. The figure is a 25% boost over the present fiscal year. Improvements will include a new cable from Ketchikan to Petersburg and three new telephone repeater installations along the Alcan Highway.

Dials Spin at Delancey, N. Y.

Eighty-eight automatic telephones in the Hamden-Delancey, N. Y. area recently went into operation. Horatio Adee, vice president of Delhi (N.Y.) Telephone Company, which services the section, announced that the relay dial exchange, situated in a small building near Delancey, handled the heavy traffic "like a charm."

Mr. Adee said the company plans to continue building lines in the Bagley Brook, Terry Clove and Basin Clove, N. Y., areas with hopes of being able to furnish telephone service to residents of those districts before next winter. The company also plans to give service to about 100 families which have formerly been served by the Bovina Center Co-operative Telephone Co.

Changeover for Belmond, Ia.

The Central Telephone Company has started erection of a new 31x81 ft. exchange building at Belmond, Ia.

The new concrete and light gray face brick building will be located north of the present telephone office. It will be one story with basement under the front half. The rear of the building will be a three stall garage for the company vehicles.

The basement will house a battery room, cable vaults, shower, heating room, and plenty of storage room.

The completion of the building will be followed by changeover to automatic equipment.

Automatic For Johnston City, Ill.

Johnston City, Ill., recently welomed its new automatic system and became another completed step of a Williamson county modernization program by the Illinois Commercial Telephone Co.

Installation of the new equipment was completed at a cost of $75,000 to $80,000.

Automatic systems for Williamson county, with the exception of Marion and Creal Springs exchanges, will probably be completed this year at an expense of $350,000, according to H. R. Sewell, Williamson county manager.

COURT & COMMISSION ACTIVITIES

Los Gatos Stock Issue

The Los Gatos (Calif.) Telephone Company has asked permission to sell 11,500 shares of $10 par value common stock. The petition to the California Public Utilities Commission said the shares would be prorated among present stockholders at $16 a share. Stockholders would be allowed to buy one share of the new issue for each share now held. Proceeds would underwrite purchase of the Morgan Hill Telephone Company for $50,000. It would also allow payment of $90,000 in notes,

(Please turn to page 76)

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PRESSURE TREATMENTS of Southern Pine Poles, Crossarms, Conduit, Cover Plank, Ground Wire Moulding with No. 1 Creosote Oil or Pentachlorphenol are carried in stock permitting prompt shipments of carload and less than carload orders. Mailing address: P. O. Station "A", Atlanta, Ga.

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A HANDBOOK for Telephone Men

INDEX—Pole Line Design
DATE—August 15, 1948

SUBJECT—Use of Strain Insulators in Guys

IN THE CASE of a power guy crossing a telephone guy, place an insulator on each side of the crossing point so that if either guy sags against the other, the required isolation will be ob-obtained.

Figure 3 shows how a strain insulator is inserted in guy strand. *Table No.* 1 gives the size of strain insulator to use for given power line voltages. In the case of higher power line voltages than those indicated in the table, a power type strain insulator should be obtained from the power company for properly insulating the guy.

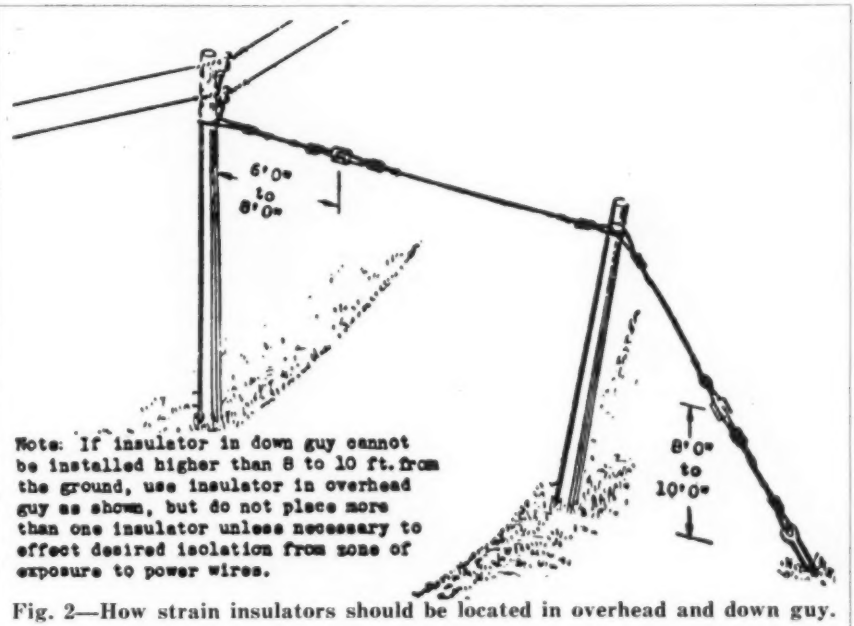

6'0" to 8'0"
8'0" to 10'0"
Note: If insulator in down guy cannot be installed higher than 8 to 10 ft. from the ground, use insulator in overhead guy as shown, but do not place more than one insulator unless necessary to effect desired isolation from zone of exposure to power wires.

Fig. 2—How strain insulators should be located in overhead and down guy.

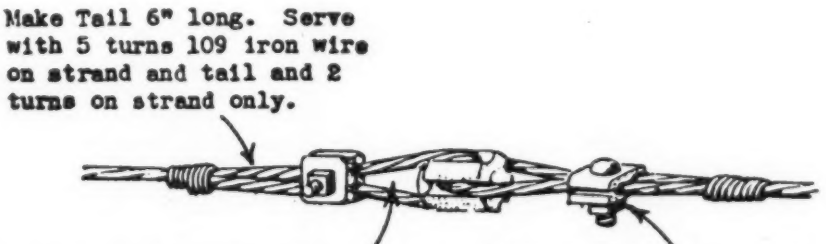

Make Tail 6" long. Serve with 5 turns 109 iron wire on strand and tail and 2 turns on strand only.
Make loop approximately equal to length of insulator.
One 1-bolt guy clamp on 2,200 pound, one 3-bolt clamp on 6,000 or 10,000 pound, or two 3-bolt clamps on 16,000 pound strand.

Fig. 3—Method of attaching strain insulator to guy.

Table No. 1—Sizes of Strain Insulators for Common Power Line

Size of Strand	300 to 5000 volts	Over 5000 up to 17000 Volts	Over 17000 up to 34000 Volts
2200- and 6000-lb.	No. 502	No. 516*	2 No. 516 in series
10000- and 16000-lb.	No. 504	No. 516*	2 No. 516* in series

** Wet process multi-fin insulator.*

Stringing Line Wires In Rural Areas

(*Continued from page 53*)

jacent telephone circuits or to minimize inductive interference.

Transpositions are most easily made, when drop brackets are used, by throwing the required number of transpositions in the line wire for the mile section. This is done at the time the coils of wire run out in the unreeling operations and additional coils are placed on the reels.

As the wires are tied in at the insulators, the transpositions are pushed ahead until they come to a transposition point indicated on the scheme. At this location, the wires are allowed to cross once at the drop bracket and the associated insulator pin on the crossarm. The wire to be placed on the drop bracket is passed around and under the end of the crossarm to this position. This procedure is repeated at each transposition point, until the next mile location is reached, when the wires will then become straight.

This article has attempted to present the mechanical details of wire stringing operations. As pointed out in the opening chapter of the article, it is very important to keep construction costs at a minimum. In addition to learning good construction practices, each man should be trained to perform his job safely and efficiently and to cooperate willingly with others in his group. Furthermore, each phase of the construction work should be planned to follow one another with little or no hitch.—THE END.

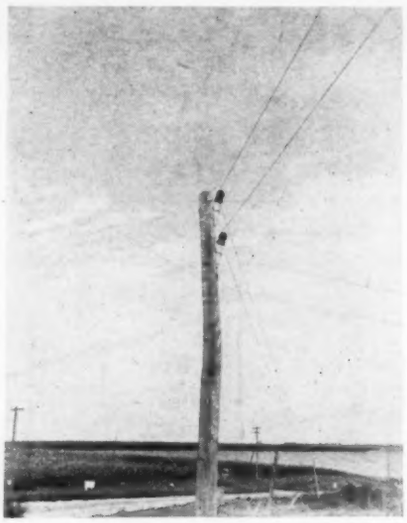


Figure 15. Wires at corner bracket placed to pull against insulators on corner pole.

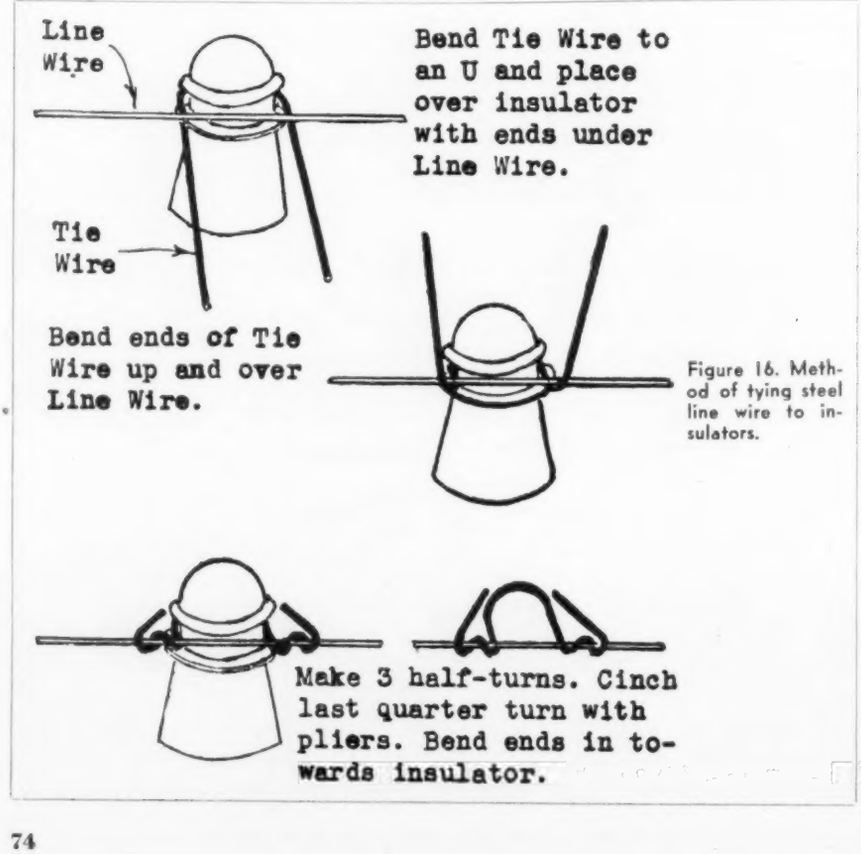
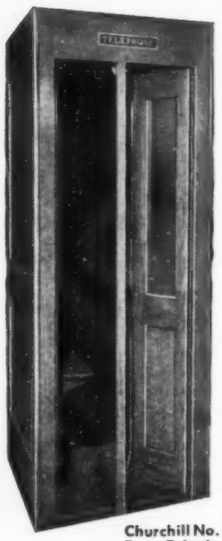

Line Wire
Bend Tie Wire to an U and place over insulator with ends under Line Wire.
Tie Wire
Bend ends of Tie Wire up and over Line Wire.
Make 3 half-turns. Cinch last quarter turn with pliers. Bend ends in towards insulator.

Figure 16. Method of tying steel line wire to insulators.

STROMBERG



Churchill No. 100 Folding Door Telephone Booth

The **churchill telephone booth**

. . . an invitation to use the pay station

Operating companies have found the CHURCHILL No. 100 Folding Door Telephone Booth a builder of pay station business.

It is constructed as a single unit and equipped with a reinforced back panel for mounting a wall telephone or coin collector.

The CHURCHILL Booth is made of selected white oak and is available in light or medium oak in a satin finish.

Included as standard equipment are electric light and automatic electric ventilator.

Overall height is 84¾"; width, 30½"; depth, 30½". Shipped knocked down and crated.

Illustrated literature available.

STROMBERG-C

BRANCH OFFICES: CHICAGO 6 ANSA

RG-CARLSON Recommends

low first cost . . .
low operating cost . . .
dependable service . . . **long life**

Provides constant, humless Direct Current supply to operator's circuit on magneto switchboards. Operates direct from lighting circuit. Incorporated in the PA-05004 is a Power-Off Relay. This relay is continuously energized from the AC line. In case of AC power failure, the operator's circuit is automatically transferred to stand-by dry cells with no interruption in service.

The Electrox PA-05004 Battery Eliminator consists of a transformer; rectifying elements rated for continuous service that require no attention or periodic replacement; ample choke and condenser filtering system; power-off relay, and rubber-covered AC attachment cord and plug, compactly mounted in a well-ventilated steel cabinet arranged for wall mounting. Cabinet is attractively finished in black wrinkle and measures only 4″ x 4″ x 6½″.

Electrox Battery Eliminator PA-05004 Mfd. by Rectifier Division of The Schauer Machine Co., Cincinnati.

for long spans *specify armstrong's glass insulators*

Tests in both field and laboratory have demonstrated that Armstrong's Glass Insulators are actually *stronger than their supporting pins!* This means that Armstrong's Glass Insulators can be used on the longest practicable spans.

Manufactured by automatic precision machinery, these Insulators are checked every step of the way. From batch materials to finished product, they are under rigid chemical, microscopic, and polariscopic control to insure highest physical and electrical properties.

For the finest in glass insulators, specify Armstrong's—used by leading communication systems throughout the world.

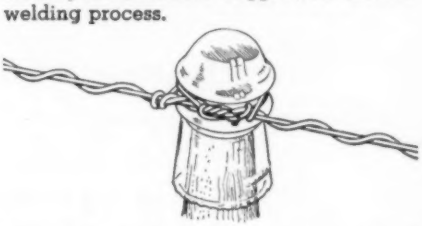
They conform to—or exceed—A.S.T.M. standards

its Protection is more than skin deep—

—it's

copperweld!

Copperweld wire does not depend for protection upon a thin deposit that temporarily coats the steel core, but upon a thick covering of copper, the molecules of which are permanently welded to those of the alloy steel by the exclusive Copperweld molten-welding process.



In addition to life-long protection against corrosion, Copperweld Telephone Line Wire gives you excellent voice transmission plus high strength for long span construction and the ruggedness to withstand winds, ice and falling trees.

Yes—the protection afforded by Copperweld is "more than skin deep"—it really lasts! So, wherever you need the conductivity and rust-resistance of copper with the rugged strength of steel, play safe—install Copperweld.

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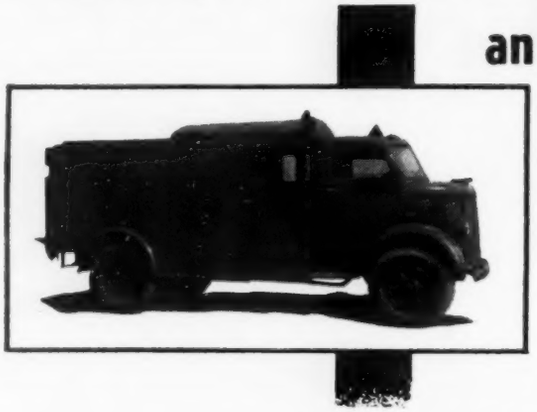
STROMBERG Telephone CARLSON

It takes QUALITY PERFORMANCE to get an ENCORE . . .



and YORK-HOOVER BODIES get "encore orders" time after time

The fact that operators everywhere keep re-ordering York-Hoover Bodies is proof of their confidence in and approval of the York-Hoover product.

Specific purpose design to do a particular job, experienced and skilled engineering for dependability, and honest workmanship for economical maintenance and low depreciation—all contribute to this customer confidence and approval.

To meet this healthy, steadily growing demand, York-Hoover has increased plant and production facilities so that we hope to say "prompt deliveries" in the not-too-distant future.

YORK, **YORK-HOOVER BODY DIVISION CORPORATION** PENNSYLVANIA

Court & Commission Activities

(Continued from page 72)

$14,000 in accounts due, and construction of a $14,670 building in Morgan Hill. Another $14,500 would be used for the site of a new dial exchange in Los Gatos.

Certificate Cancelled

The certificate of public convenience and necessity held by the Red Bank Telephone Co., Tensleep, Wyo., has been cancelled by the Wyoming Public Service commission.

The commission ordered the cancellation after holding that the company had abandoned a needed service without notifying the public or the PSC.

The company had been furnishing service between Worland and Tensleep since 1932.

Claims Wrong Listing

The Southwestern Bell Telephone Co. was named defendant in a recent $22,500 damage suit filed in St. Louis, Mo.

The petition stated the delay in the arrival of fire-fighting equipment when fire destroyed a filling station last Feb. 14, was caused by the incorrect listing of the Affton Fire Department in a telephone directory and the failure to get the correct number when "information" was called.

It was charged that by the time the correct number was obtained and the fire equipment summoned the blaze was out of control.

8-Exchange Increase Denied

The Public Service Commission of Indiana has granted the petition of the Midwest Telephone & Utilities Co., Inc., of Petersburg, for an increase of rates in Decker, Winslow, Petersburg and Hazelton and denied the company authority to increase rates at Union, Fritchton, Monroe City, Wheatland, Epsom, Montgomery, Glendale and Otwell.

The commission said in its ruling that to allow the requested increase in rates at the exchanges where service was "definitely poor" would be to allow the company through its collection to make capital improvements which were needed. "The raising of

(Please turn to page 78)

Bethlehem Strand

IS

Uniform Strand

Breaking out a new reel of Bethlehem strand today? You'll find it as good as the one you used last week—as uniform in quality and workmanship, as easy to handle. You can be sure, too, that your Bethlehem strand on order for the future will measure up to the same high standards.

We like to stick out our chest and crow a little about this uniformity. In the making of strand, uniformity is one of our prime objectives. And we're as fussy, too, about our coating. The bethanized coating, which armors every inch of Bethlehem strand, is a zinc of high purity, applied electrolytically. This method produces a smooth, ductile jacket of uniform thickness—no ripples or thin spots.

The whole story can't be told here, but we'll be glad to furnish full details at your convenience. Say when, and our nearest representative will get in touch with you promptly.

BEND IT ALL YOU WANT!

The bethanized coating easily stands punishing bends like this. Coating is available in three weights: A, equivalent to extra-galvanized; B, twice the weight of A; C, three times the weight of A.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

String Along with AMERTEL

for Greater POLE LINE ECONOMY

Save money on new pole line construction and replacements. Amertel is the perfect combination of greater tensile strength, lower resistance, and superior galvanizing—the wire that makes every job a better job. Telephone men know that Amertel "85" affords greater efficiency and economy in their line work.

Amertel's modern "hot process" method of galvanizing assures you the utmost in protection against corrosion. Greater tensile strength means a longer span—saving in poles, cross-arms, and hardware—thereby reducing initial costs and upkeep.

Today, foresighted telephone men are ordering the wire of combined qualities for all their line work. It's Amertel "85"!

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1033 WEST VAN BUREN STREET, CHICAGO 7, ILLINOIS

capital," the ruling stated, "is a responsibility of the stockholders and is not the responsibility of stockholder's patrons."

Therefore, the request for increases in rates at those exchanges which were described as "in old, antiquated and poorly maintained plants" was denied.

New Company Formed

Approval of the withdrawal of the Elmo (Kans.) Telephone Exchange from the Farmers Mutual Telephone Co. Upland, (Kans.) has been received from the Kansas State Corporation Commission.

A corporation was formed in Elmo, January 16, 1948, to operate the exchange seperate from the Upland system. Application then was made to withdraw from the old association.

Officers and directors of the Elmo company are: John Bonfield, L. H. Guthals and Lowell Abeldt, directors; Lowell Abeldt, president, John Feeney, vice president; George Tischhauser, secretary and Virgil G. Orth, treasurer. Mrs. Ed Rufener is the operator.

The Elmo company was authorized to issue 300 shares of capital common stock at $10 per share with a limit of one share per user.

The commission granted the Elmo company the right to increase rates to $5 per quarter, effective July 1.

Elmo will continue to provide free service to its 140 patrons in adjacent inter-exchange call as was provided under the Upland system operation.

New Rates for Douglas, N. D.

Douglas (N. D.) Telephone Co., furnishing local exchange telephone service for 104 subscribers in Douglas, N. D., showed North Dakota Commission that it experienced an operating loss during 1947 of $115.15, exclusive of depreciation, and received prompt approval of its application for increased rates.

Rates effective July 1, 1948 are: Town Business, $3.00; Town Residence, $2.00 and Rural Residence, $2.00.

New Rates for McClellanville, S. C.

A new rate schedule for the Commercial Telephone System of McClellanville, S. C. has been authorized by the state public service commission.

The commission granted rate increases after the company declared present income would not cover costs of new installations.

Rates were set at $4 for a business one-party line, $3 for a residential one-party line, and 30 cents per quarter mile of line outside the base area.

PEOPLE

Illinois Telephone Co. has announced the transfer of **Charles A. Crane,** district manager of the Paris, Ill. district to Jacksonville, Ill. as area manager for exchanges in Morgan and Green counties.

Mr. Crane has been associated with the Paris district of the telephone company for 10 years, supervising the exchanges of Paris, Marshall, Chrisman, Redmon, Metcalf, Vermillion and West Union.

J. B. Cherry, a veteran of 28 years in the telephone business and former district manager of the Illinois Telephone Company's western district with headquarters at Bushnell, has been named to succeed Mr. Crane.

JACK CROWLEY

". . . popular secretary of Minnesota association celebrated 50th anniversary in telephone field and wedding anniversary on Aug. 14."

H. W. Hoffine, purchased the Mission (S.D.) Telephone Co.; plans to expand and improve the plant and facilities to provide adequate service.

L. V. Stinson, directory engineer for L. M. Berry & Company, Dayton, Ohio, retired July 1 after 23 years of employment with that company. He was well known to telephone people throughout the territory in which the directory organization operates as he travelled extensively for many years, and also attended many State and National telephone conventions.

Mr. Stinson was born in Richmond, Indiana on March 19, 1874, and grad-

CROSSARMS MAY LOOK ALIKE, BUT—

Last Longer!

Any two crossarms may look alike in the stockpiles, but one may last 12 years on the line and another 36. The difference is the result of expert selection of raw material, scientific kiln drying and controlled air seasoning. Rainier Crossarms are properly conditioned for long-lasting life from the best grade of tough-grained Douglas fir. When you order crossarms, specify Rainier Crossarms made by

RAINIER

AMERICAN CROSSARM AND CONDUIT CO.

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SPECIAL

C. B. WALL TELEPHONES

"LIKE NEW"

Complete with dial blank, S. L. Ringer..... $11.00

Complete with dial blank, Harmonic Ringer 11.50

"Like New" Dials, A. E. 4.50

Your dials rebuilt..... 4.00

TELEPHONE REPAIR & SUPPLY COMPANY

DAN'L H. McNULTY, President and Manager

1760 Lunt Ave. Chicago 26, Ill.

GraybaR
TELEPHONE SUPPLIES
BULLETIN

LINE WIRE
and strand

The exceptional tensile strength of *Crapo* HTL-85 and HTL-135 telephone line wire makes possible long spans and low-cost construction... helps keep service interruptions and maintenance costs at minimum. Graybar distributes both *Crapo* line wire and *Crapo* galvanized steel guy strand.

CABLE ACCESSORIES

When you see "Reliable" on any telephone supply item, you can be sure it's as good as its name. That's why Graybar distributes *Reliable* cable terminals, hangers, and grips; drop-wire clamps and drive hooks; static-discharge blocks; testing clips.

That old but meaningful word "quality" describes *all* the telephone supplies that Graybar distributes. The availability of many items is increasing, and your near-by Graybar Representative will be glad to help you get the things you need. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.*
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IN OVER 100 PRINCIPAL CITIES

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At each of our 18 key houses, there are Graybar Specialists in communication, inside electrical construction, outside construction, lighting, power apparatus, and other electrical lines. These men have intensive experience in their respective fields and are competent to assist you on technical problems. The services of both your local Graybar Representative and near-by Graybar Specialists are always available to you.

uated from Richmond High School. He started work with the Central Union Telephone Company in Indianapolis in 1903, later working for R. R. Donnelley & Sons Company in Indianapolis, Chicago, and Crawfordsville, Indiana. He started with L. M. Berry & Company in April, 1925, and his retirement marked 45 years of telephone and directory service. He is a life member of both the Independent and Bell Pioneer Telephone Associations.

Shortly before Mr. Stinson's retirement, a farewell steak dinner and party was staged for him by Loren M. Berry at the Biltmore Hotel in Dayton. After appropriate short talks from a number of the older employees and the reading of many telegrams which were received from various field managers, Mr. Berry presented Mr. Stinson with a beautiful wrist watch suitably engraved.

Although Mr. Stinson has no particular hobbies, he is still well and active, and for the summer, at least, he expects to be kept busy looking after his home and yard at 231 North Rockwood Avenue, Dayton, Ohio.

Jesse Tudor, Tipton County, Ind. sheriff whose term will expire January 1, 1949, is to be made manager of the Kempton (Ind.) Telephone Co.

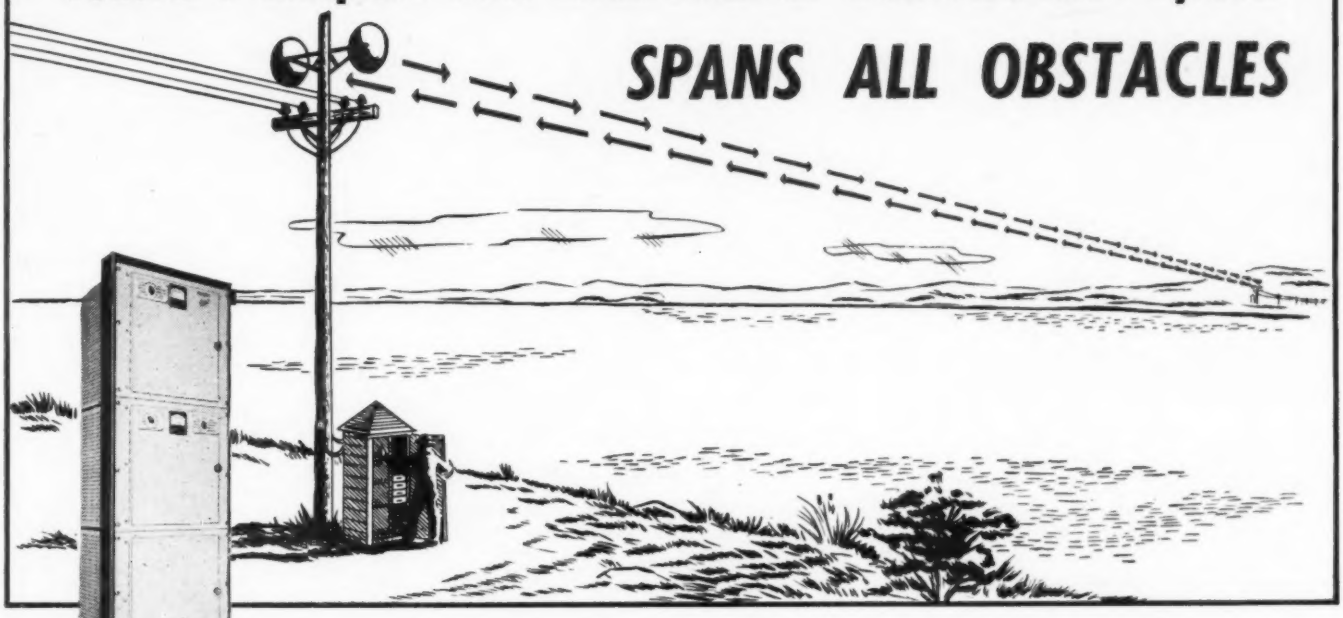
Mr. Tudor was formerly a line foreman for the Tipton (Ind.) Telephone Co. and later was distribution superintendent of the Tipton Electric Light Co.

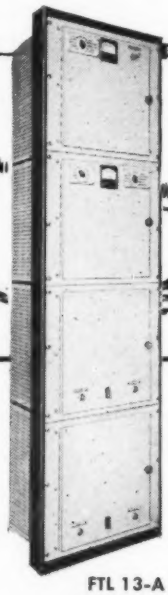
John Holland has been named to manage the Slayton, Minn., area of the Central Telephone Co. He will be in charge of the company's operations in Slayton and the neighboring towns of

RICHARD REIMER
". . . joins Federal Tel. & Radio Corp., to represent the company's mobile radiotelephone division in Southern California."

Federal's Complete New Multi-channel Communication System

SPANS ALL OBSTACLES





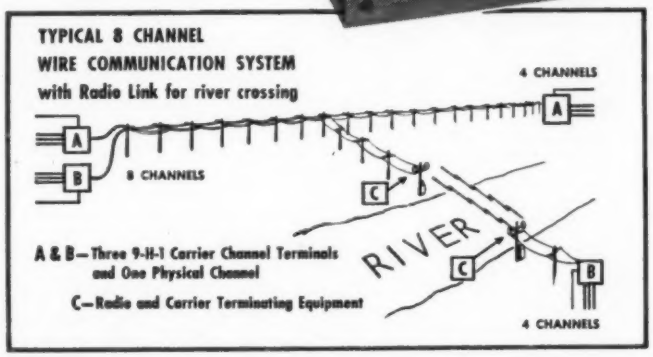
FTL 13-A
Radio Link

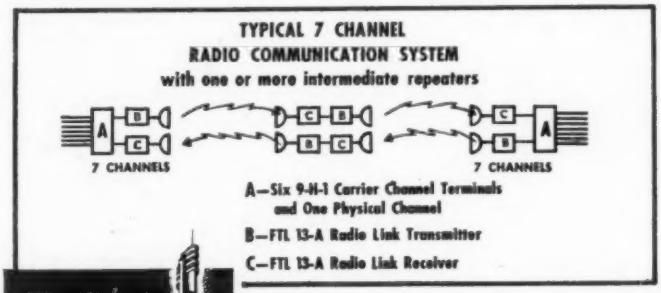
UHF, Broad Band, FM Radio Link

and

FTR Carrrier Telephone and Telegraph Equipment

FTR 9-H-1 Short-Haul Carrier.





offer you new flexibility and economy for multi-channel wire or radio systems

Federal's new UHF broad band radio link, for multi-channel telephone and telegraph service, can be used as a complete communication system—or as an intermediate link in cable or open wire systems. It is especially designed to provide economical communication over mountainous, swampy, or soft terrain where pole lines are costly or impractical—and for spanning wide rivers, lakes, bays or inlets.

The FTL-13A radio link equipment has a total usable communication bandwidth from 200 to 60,000 cycles. It operates in the 890 to 960 Mc UHF band, offering the economy of low transmitter power and highly efficient directive antennas.

Write Federal today for complete information on this new type of communication system. Dept. H149

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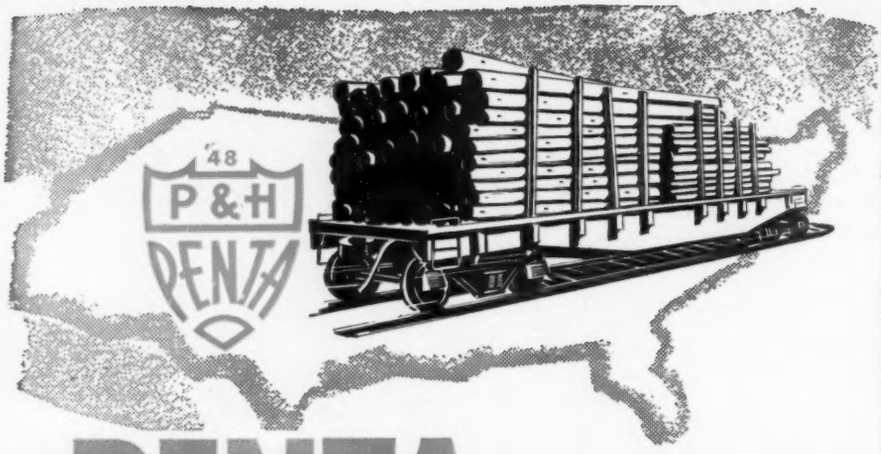

PENTA POLES

Their long life assures low per annum cost lines.

P&H

PAGE AND HILL CO.

MINNEAPOLIS, MINNESOTA · 50 CHURCH STREET, NEW YORK, N. Y. "STILL IN THE LEAD"

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How to cultivate your top executive qualities . . .

Top executives aren't born. They're made. Self-made mostly. Though they rise along different routes, the steps to their success are similar. They follow a definite course of action . . . observe a particular pattern of conduct . . . develop certain attitudes and habits—and because they press on, they arrive at the top—as planned.

DEVELOPING YOUR EXECUTIVE ABILITY

By HOWARD SMITH

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Here is a practical inspiring book which brings you this amazing success formula. It outlines a specific, detailed plan for cultivating the qualities which mark the top-flight business leader today—illustrating each point with intimate on-the-job studies of currently outstanding executives. Packed with helpful pointers, suggestions, instructions, concrete facts, as well as actual examples, the book tells how the up-and-coming executive can make the most of his capabilities and grow in executive stature.

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A PRIMER OF ELECTRONICS

By DON P. CAVERLY

Commercial Engineer, Sylvania Electric Products, Inc.

235 pages, 5½ x 8, illustrated, $2.25

Here is an especially clear and simple explanation of electronics and electronic tubes and circuits for all concerned with the manufacture, application or operation of household or industrial electronic devices.

The book begins with the atom, the electron, and static and electron discharges and takes the reader step by step through explanation of electric current, magnetism, and electromagnetic radiation, to an understanding of simple radio tubes, fluorescent lamps, cathode ray tubes, ignition, thyratron, and other tubes and their basic connections for practical purposes. The text is concise and written in language that anyone can understand, yet is technically authoritative and complete.

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Telephone Engineer Pub. Corp.

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Balaton, Currie, Lake Wilson, Avoca and Iona.

Mr. Holland transfers from Canby, Minn., where he has been in charge of the telephone properties of Canby, Porter and Ivanhoe during the past six years.

F. H. Simmons, exchange manager for the Illinois Commercial Telephone Company at Du Quoin for 14 years, recently was promoted to the position of area plant supervisor in a newly-formed northern area with offices at Belvidere. He was succeeded here by **Paul E. Wanstreet,** formerly wire chief at the Carbondale, Ill., exchange.

CHARLES E. WAMPLER

". . . appointed assistant v.p. of Illinois Bell; succeeds LELAND R. MAPES *who died May* 1."

When **John H. Shull** recently drew his final salary check from the Intra State Telephone Company, Galesburg, Ill., he had completed 45 years with the Intra State company and over a half century in telephone work.

Mr. Shull became the first employe of the newly organized Galesburg Union Telephone Company in October, 1901. As an experienced worker with five years training in Peoria, he started with the company when only 600 were listed as subscribers. Now there are 11,000.

Toral Duckett, divisional manager of the Central Telephone Co., has announced the transfer of manager **Norman Peterson** of the New Rockford, N. D., exchange to Canby, Minn., where he will have supervision over the company's operations in that area.

Mr. Peterson, who has been located at New Rockford for the past seven years, will have charge of the Canby, Ivanhoe and Porter, Minn. exchanges.

AUTELCO-GRAY PAYSTATIONS

Rescue Lost Revenue

The Type 62, shown above, provides central-battery prepay service with any central office equipment, either automatic or manual, having 110-volt coin-control facilities. It is one of the many available types of Autelco-Gray Paystations which include assemblies to meet every requirement of paystation service.

Get Extra Operating Income with Modern "60" Series Paystations

Wherever you install Autelco-Gray Paystations you are assured of continuous revenue that otherwise is lost when a prospective user "borrows" a private telephone.

Guard against this loss of operating income by installing modern Autelco-Gray Paystations. Every drug store, bus station, gas station, restaurant—every place where people meet—provides an extra source of telephone-user income. Autelco-Gray Paystations pay for themselves in the extra income they produce, and they continue to produce for many years after their initial cost has been absorbed. Ask for details on the complete Autelco-Gray line.

AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems
Makers of Telephone, Signaling and Communication Apparatus . . Electrical Engineers, Designers and Consultants

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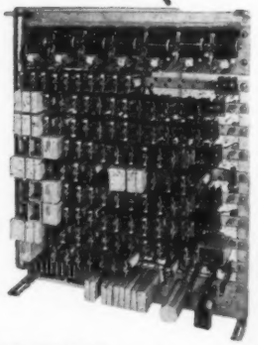
Your customers deserve the service advantages of Federal's modern PABX facilities.

EXCLUSIVE in design and variety of convenient operating features . . . rugged in construction . . . economical to install . . . simple to operate and maintain—the full line of Federal PABX equipments will meet practically every subscriber and business requirement.

Federal PABX equipment features these important advantages: automatic intercommunication between all local stations . . . consultation calls from any station while "holding" a trunk call . . . trunk transfer at any station . . . partial or complete restriction for any station . . . complete secrecy of all conversations . . . continuous and immediate 24-hour service without attention of operator.

Federal is ready to assist you on any PABX equipment requirement or application. For complete information on these or any other of Federal's products write to Telephone Sales Department G-948, Federal Telephone and Radio Corporation, 100 Kingsland Road, Clifton, N. J.

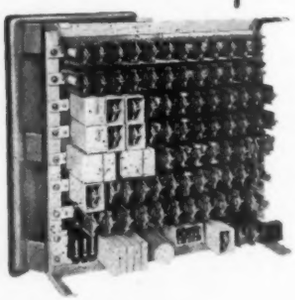
For medium-sized installations



For the small business and large residence

6E PABX

- **2 Central Office Trunks**
- **6 Local Stations**
- **1 Local Link**



6E PABX is shown with cover removed. Measures only 18" x 18" x 8"...weighs only 60 pounds ...designed for wall mounting... easy access to all components and wiring, with removable dust cover and hinged relay gate.

11P PABX

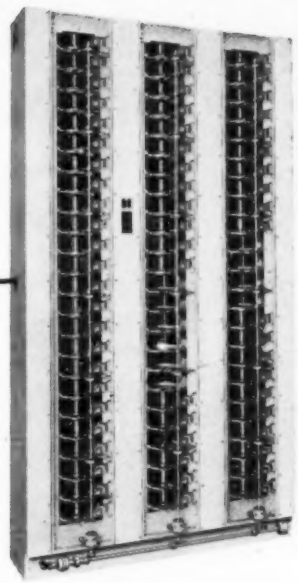
- **3 Central Office Trunks**
- **10 Local Stations**
- **2 Local Links**

11P PABX with covered removed. Measures only 26" x 21" x 9"...weights 85 pounds...wall mounting...ready access to all components and wiring with removable dust cover and hinged relay gate.

7J PABX

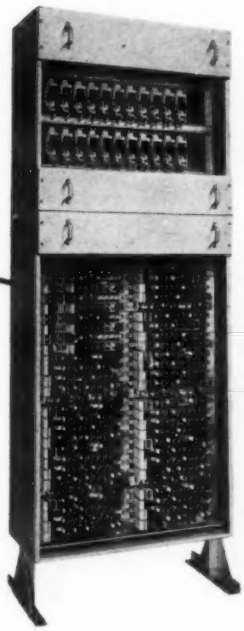
- Central Office Trunks as Required
- 100 Local Stations or More
- Local Links as Required

This equipment is the 7J Rotary System designed for PABX installations. Any desired line and link capacity can be furnished. Equipment is mounted in one or more master frames, each measuring 8' 6½" high, by 56" wide, by 26" deep. Frame construction, switches and relay gates are the same as those used in the 7J Rotary System.



For dial installations in industry and commerce from 100 to 4000 Lines

For large offices . . . stores . . . factories . . . institutions



35 type PABX

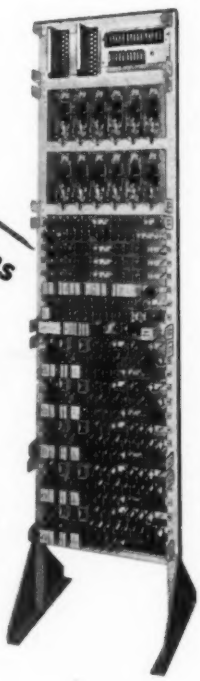
Available in Two Capacities

- 10 Central Office Trunks
- 50 Local Stations
- 6 Local Links

- 10 Central Office Trunks
- 99 Local Stations
- 12 Local Links

35 Type PABX is shown with dust covers removed. This equipment is capable of handling heavy traffic in both outside and local calls. The 50-line unit measures 8¾' high, by 38¼" wide, by 19¾" deep. Two units 7'2" high, by 38¼" wide, by 19¾" deep comprise the 99-line equipment. Racks are fully enclosed by dust-proof paneling with removable covers for easy access to wiring and components.

For Industrial plants . . . larger stores and institutions

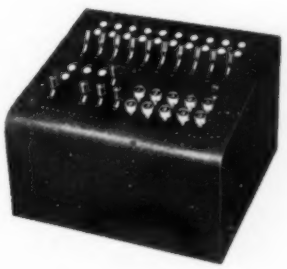


25C PABX

- 5 Central Office Trunks
- 25 Local Stations
- 3 Local Links

25C PABX with all dust covers removed, provides easy access to all components and wiring. All equipment is compactly mounted on a vertical rack, 7' high, by 21" wide, by 20" deep.

Key Pulsing Attendant's Set designed for efficient and convenient trunk call distribution with Federal's 35 type PABX.



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Dicke wire grips are as necessary as the wire itself in the maintenance and construction of communication lines. Built to rigid specifications, they hold without damaging wire. Heat-treated alloy steel permits stronger construction without adding weight. Heavy cadmium plate prevents rust, maintains smooth operation over years of use.

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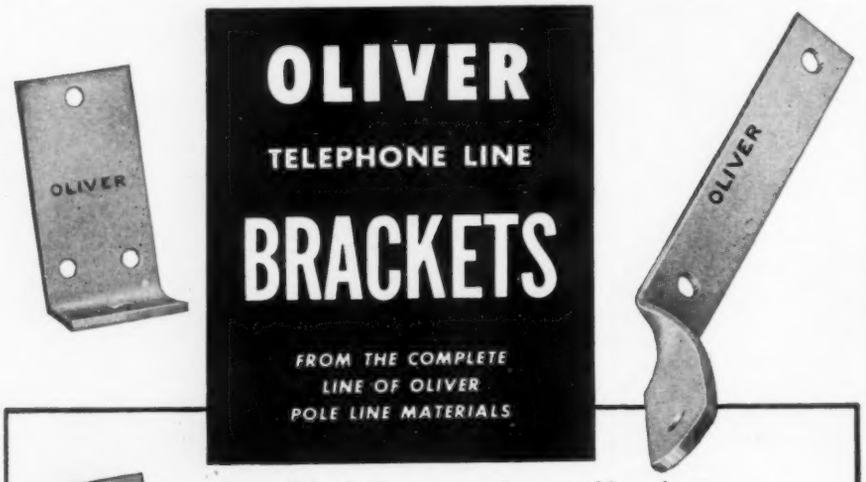

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FROM THE COMPLETE LINE OF OLIVER POLE LINE MATERIALS

You will find all types and sizes of brackets required for telephone work in the complete Oliver line. Some of the popular styles are illustrated. Various types suit the practices and requirements of leading telephone, telegraph and railroad companies. For full details see Catalog 43.

OLIVER
IRON AND STEEL
CORPORATION

South Tenth and Muriel Streets · Pittsburgh 3, Pa.

MAKERS OF POLE LINE MATERIALS SINCE 1894

KELLOGG: Anchorage, Alaska, Contract Signed

Alaska's largest all-automatic commercial telephone system was assured recently when officials of the Anchorage city council signed contracts for the installation of a new 3,000-line Kellogg Relaymatic switchboard and its related equipment. The Kellogg Switchboard & Supply Company, Chicago, pioneered the installation of an all-automatic telephone system in Alaska with the opening of the new exchange at Kodiak Island last May 21.

The new installation at Anchorage marks the addition of an important link in Alaskan and continental communications and materially increases the potential of the Territory of Alaska in hemispheric defense.

Installation of the new telephone system in Anchorage will replace the city's present manual system used by 2,800 subscribers there.

The two all-Kellogg dial telephone installations at Anchorage and Kodiak, together with the all-Kellogg manual telephone systems at Sitka, makes the Kellogg company the major supplier of telephone equipment in Alaska.

EXIDE: Purchases Alcoa Plant

R. W. Williams, executive secretary of the Electric Storage Battery Co., Philadelphia, has announced purchase of the Fairfield, Conn., plant of the Aluminum Co. of America.

No purchase price was announced but Williams stated cost of fitting the building for occupancy, equipment and inventories and the purchase price combined would amount to $1.6 million.

Quick Reference Dial Indicates Safety Hazards

The new Davis Safety Aid Dial introduced by Davis Emergency Equipment Co., Inc., manufacturers of safety equipment, as analysis and gas alarm equipment is a ready reference and aid to anyone connected with safety from the foreman on up to the manager of the safety department.

The Dial gives safety men a quick reference for many of the daily hazard problems which would take hours of time consulting a number of safety manuals and text books. There are two sides to the Davis Safety Aid Dial. The operation side covers the following: (1) 45 different mechanical operations in industry; (2) suggested head, eye and face protection for each operation; (3) body protection for each operation, and (4) respiratory protection for each operation.

If in any operation, some harmful

DAVIS SAFETY AID DIAL
". . . quick reference to hazard problems."

substance might be used, an indication is given which refers to the other side of the chart where substances are listed. The substance side lists 55 different fumes, vapors, gases, dusts etc. and gives the following information about each: (1) Probable safe concentration for an 8 hour exposure; (2) suggested protection and control measures; (3) usual method of entrance to the body; (4) flash point and (5) lower explosive limit.

The Dial is printed on heavy coated cardboard. Quick easy reference is obtained by turning the inner dial until the arrow points to the problem. Answer references are then shown in the window cut out. Dials are eyeletted for hanging in convenient places. For more information write New Products' Editor, Telephone Engineer Publications.

CHANCE: Appoints Salesmen

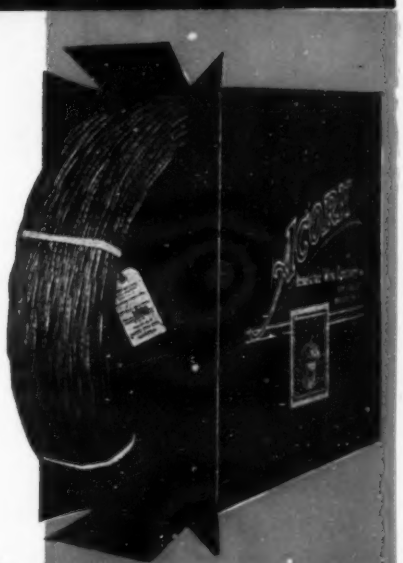
Continuing its general expansion program, the A. B. Chance Co., Centralia, Mo., has appointed three new salesmen —Robert G. McCulloch, Winfield G. Michaelis, and Robert L. Scott.

Mr. McCulloch, a rural electrification specialist, formerly with Southern Engineering Co., and J. B. McCrary Engineering Corp., Atlanta, has 12 years sales experience in the Southeast. He will travel Alabama and eastern Tennessee from headquarters in Birmingham.

Mr. Michaelis, until recently sales manager for the Sackett Electric Corp., Columbus, O., will locate in Columbus, selling Ohio and eastern Kentucky. He has had 20 years sales and service experience in the electrical field.

Mr. Scott will represent the A. B. Chance Company in Indiana and western Kentucky from headquarters in Indianapolis. He has been sales engineer with the P. R. Mallory Co., Inc., Indianapolis.

ACORN INSULATED WIRE



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Lay-Cit Cable Grip is a neat compact grip that is easily and conveniently installed. Linemen can either take up or let out slack, by simply spreading the plates and adjusting the lacing.

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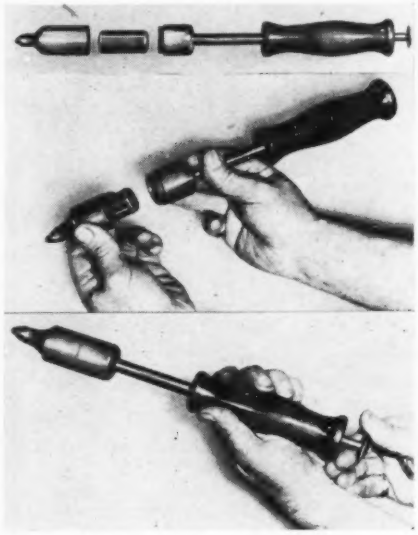
Soldering Iron Heated By Chemical Cartridge

Requiring no electric curent or external heat of any kind, a new soldering iron, known as the QUIK-SHOT, utilizes a chemical cartridge that heats the iron to working temperature in five seconds, and maintains intense heat for fully 10 minutes.

The cartridge, which is about the size of a small flashlight battery, contains a primer and is ignited in a manner similar to that of firing a bullet. When the cartridge is placed in the copper tip of the iron and the spring rod is pulled and released at the back of the handle, the pointed rod strikes the primer and sets off the heating action, which is created by a chemical mixture of certain metal powders and an oxidizing agent. The cartridge is absolutely non- explosive.



"QUIK-SHOT" SOLDERING IRON
". . . working temperature in 5 seconds."

Ideal for all kinds of outdoor work where blowtorches are ordinarily required, the Quik-Shot iron is very convenient for indoor work anywhere in home or plant because of its freedom from the need to work near electrical outlets, as is the case with electric irons. For complete information write New Products' Editor, Telephone Engineer Publications.

E. W. Plagge Named President of Export Managers' Club

E. W. Plagge, division sales manager for Latin America, International Automatic Electric Corporation, was recently elected president of the Export Managers' Club of Chicago, an organization of about 500 members active in export trade.

Mr. Plagge has been in the employ of the Automatic Electric group for more than 27 years. A graduate of Iowa State College (B.S. '20), he took the company's training course in that year and for some time afterwards engaged in automatic telephone installation work. On his return to Chicago he was assigned to the domestic sales organization, and shortly afterwards joined the staff of the export sales company. He has since been increasingly active in the promotion of Automatic Electric's export business, and is a keen student of export trade in the communication equipment field.

E. W. PLAGGE
". . . elected president of the Export Managers' Club."

BIDDLE: New Bulletin

The James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa., recently released Bulletin 24-25 on the Biddle "Ducter" Low Resistance Ohmmeter.

With the "Ducter" Low Resistance Ohmmeter the manufacturer states anyone can measure ohmic resistances down to a few millionths of an ohm simply by applying a pair of sturdy hand spikes and reading the position of the pointer over a scale. There are no manipulations or adjustments.

The "Ducter" ohmmeter is a rugged, portable, and yet accurate, field instrument that can be taken right to the job and operated by one man. It provides a simple, practical and reliable way to make low resistance tests during production and periodically while equipment is in service. The Biddle company states the unit is helping to prevent failures and unnecessary losses of power in many types of apparatus—especially where heavy current is carried. It is also a valuable tool in quality control and for indicating relative strength of welded joints.

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FOR SALE: Complete telephone system of 1,050 stations, six towns, located in the richest wheat growing part of South Dakota. One North automatic, others Kellogg magneto. Gross income 1947 $36,000 plus; $10,000 toll commissions. Price less than 1¼ times 1947 income. Excellent expansion possibilities. Debt free, everything company owned. One 300 station exchange all underground. Beautiful home could be had additional. Write Box No. 8576 c/o Telephone Engineer.

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from BD-71 and BD-72 Signal Corps switchboards: REPEATING COILS, type C-161, line winding 65 ohms, switchboard winding 58 ohms: HEAD AND CHEST SETS (HS 30), receiver and transmitter: MANY OTHER PARTS.
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HELP WANTED: First-class switchman familiar with Strowger equipment for ultimate position of Chief Switchman in 10,000 station exchange. Preferably man under 45 years of age. Send photograph and full details of experience, ability, salary expected, etc. Write Box No. 8562 c/o Telephone Engineer.

HELP WANTED: Traffic Man qualified to fill position of traffic superintendent. Opportunities for promotion and other management activity. Midwestern Independent telephone company operating forty exchanges. Write Box No. 8569 stating age, marital status, qualifications, etc.

HELP WANTED: Man capable of assuming responsibilities of plant manager and thoroughly competent in cable construction and maintenance, all relay dial and C. B. exchange maintenance and outside plant construction and maintenance. Must be under 38 years old and expect to work as well as supervise. Salary $5,000. **Pecos & Northwestern Telephone Co., Pecos, Texas.**

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THE RATES for this department are as follows: 15c a word, cash with order, please. Box number service if desired. Address all correspondence to: TELEPHONE ENGINEER PUBLISHING CORPORATION, 7720 Sheridan Road, Chicago 26, Illinois.

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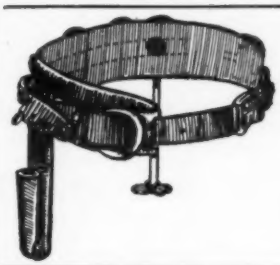

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Durable leather strap with sturdy clasps. **3.25**

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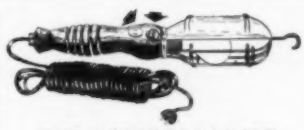

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W.M. BASHLIN COMPANY
GROVE CITY 1, PA.

FWD: Charitable Foundation

The Four Wheel Drive Foundation has been incorporated under Wisconsin law for the exclusive purpose of charitable, educational, scientific and literary work according to Walter A. Olen, president of the Four Wheel Drive Auto Co., Clintonville, Wis.

The foundation was organized on June 17, and the articles of incorporation were signed that day by Mr. Olen, Max Stieg, and D. J. Rohrer all FWD directors.

Articles of incorporation of the new foundation permit gifts and grants to charitable, educational, scientific and literary associations, corporations, institutions and societies as well as to individuals.

HICKOK: New Wattmeter

The new Hickok Model 900B Volt-Ampere Wattmeter, is designed for testing all A. C. appliances from clocks to 220 volt electric ranges. The unit incorporates a current transformer for additional ranges of 5000 and 10,000 watts, and 65 and 130 amperes.

The manufacturer states that the wattmeter tests appliances under actual use conditions; shows wattage consumption, amperes and line voltage. A new continuity test consisting of a neon lamp connected between line and load binding posts provides a simple but accurate test for shorts in power circuits.

HICKOK'S VOLT AMPERE WATTMETER
". . . tests appliances under actual use conditions."

A large 3¾ meter scale is clear, legible and accurate. The low range of 0-100 watts will measure power consumed by the smallest of appliances. Mounted in a handy, portable carrying case, the unit is especially convenient for service men in checking all A. C. equipment, as a comparison between the rated watts of a piece of equipment, as stated on the name plate, and the actual power consumed while under test gives an overall check.

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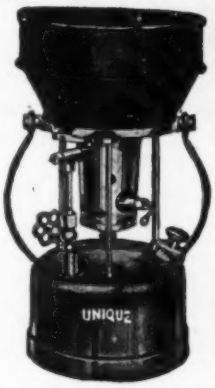
A NEW, IMPROVED—



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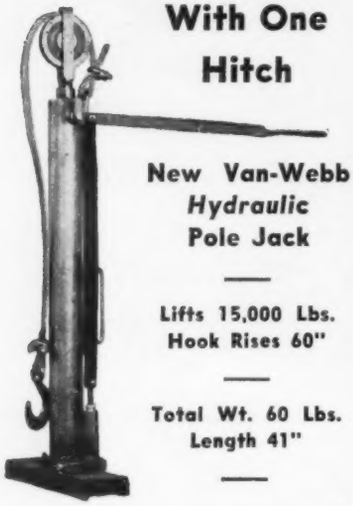

New Van-Webb *Hydraulic* Pole Jack

Lifts 15,000 Lbs.
Hook Rises 60"

Total Wt. 60 Lbs.
Length 41"

No Derricks—No Rigging
Pull from Ground Base

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THE BACK OF THE BOOK

By JOHN G. REYNOLDS
Managing Editor

Good Management "Must" . . . Suppose you felt sure you could make a better mousetrap—or any other product—and you began to think about risking your savings to start up a business of your own.

First, you'd want to make certain that you could turn out this product at a price that would enable you to meet or beat your competition. Next, you'd check very carefully to be sure there was a "market" for your type of product.

Good management would be another "must." You'd have to know how to run the business, or be able to hire someone else to do it for you. Only with good management could you keep on meeting material costs, payroll, rent, taxes, and other costs of doing business.

Finally, you'd have to see an opportunity to make a fair profit. The firm that can't earn a profit soon folds up. And like other progressive firms, you'd want to put part of your profits back into the business.

Most Americans say they think 10 to 15 cents out of each dollar of sales would be a fair profit for business to make. Government figures show that industry averages less than half that much profit.

And about half of that profit is plowed back by industry to pay for the progress and development that give Americans more good things than any other people on earth.

• • •

"Children On The Line" . . . Children can constitute quite a timetaking problem in a busy exchange. To keep abreast of all the incoming calls on her section of switchboard, an operator will refer a persistent junior caller to her supervisor with the phrase "Child on the line."

A classic one, that a supervisor is fond of telling, concerns such a youngster. The child's mother came to the 'phone where her tiny son was playfully sending signals into the exchange. When politely requested to keep the child away from the telephone, she enquired in puzzled fashion, "Oh, but why? I always let him play with the 'phone. It keeps him out of mischief!"

• • •

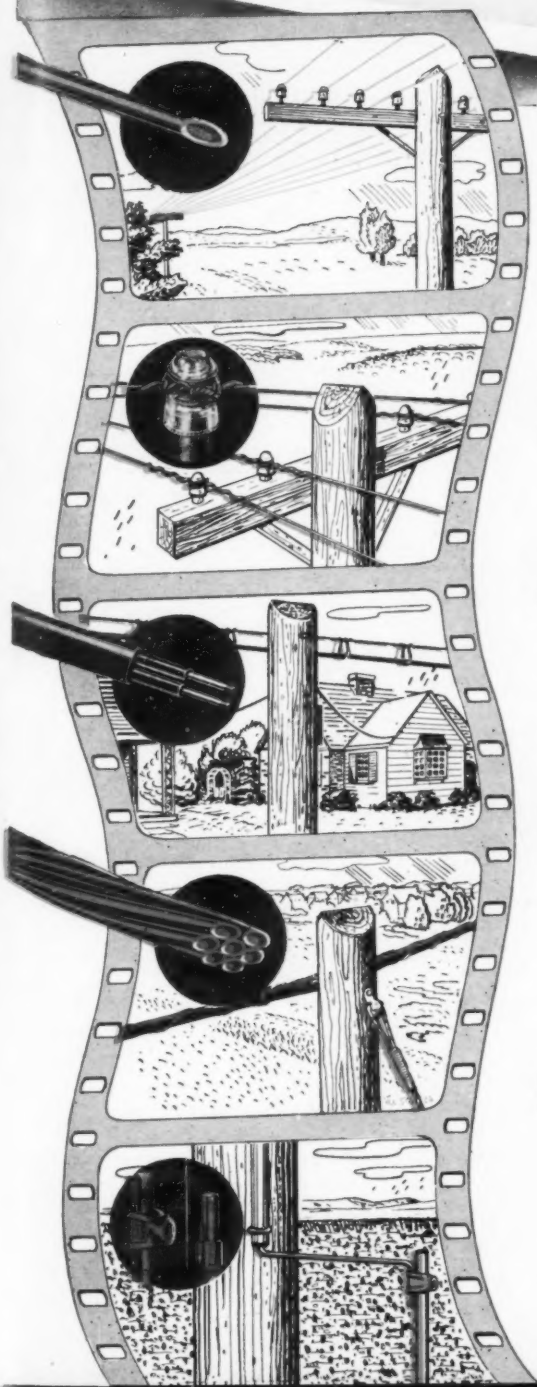
"Quizzical Note" . . . Chicago Journal of Commerce came out with best comment on the Huntington, West Va., cable-splicer who recently turned down a $7,300 radio prize and then relented and took the money.

To be sure $7,300 is a modest sum as radio prizes are running nowadays, commented The Journal. Almost any contestant with the intelligence of a fairly bright chimpanzee is eligible to win a yacht, an oil well, the Ritz-Camabert Hotel and the state of Idaho. Nowhere but in America could such fabulous prizes be offered—or declined. Nowhere else would the prize-winning be followed by such energetic sales efforts.

"To foreigners," The Journal stated, "we may seem mildly insane—but a madness whose by-products are all the signs of good living which radio prizes evince is better than the barren, dour 'sanity' of lands where there are no prizes because there is no competitive industry to offer them."

One-minute
Preview of...

DEPENDABLE
Copperweld PRODUCTS
For the
TELEPHONE INDUSTRY



Copperweld LINE WIRE

It's light in weight—high in strength—easy to string—non-rusting—safe for long spans—high in conductance—and excellent for voice and high frequency transmission. Copperweld is the ideal line wire for long-lasting construction. It is made by our exclusive Molten-Welding process in which a thick covering of non-rusting copper is permanently welded to a core of strong alloy steel.

Copperweld GRIP-FLEX 38 TIES

This high strength tie assures uniformity in construction. It is simple in design and easy to apply. Eliminates the more common faults of hand-wrapped ties, which have resulted in chafing and fatigue fracturing of conductors.

Copperweld DROP WIRE

Copperweld is the strongest drop wire made. It has the stamina to combat heavy ice and wind loads. No. 17 AWG Copperweld parallel or twisted pair drop wire has a guaranteed breaking strength of 400 pounds, No. 18—340 pounds. It combines this rugged strength with high conductance and high resistance to corrosion.

Copperweld GUY & MESSENGER STRAND

You can eliminate the necessity of replacing guy and messenger strand every few years by always specifying Copperweld. With Copperweld, you don't need to buy oversized strand as a protection against later loss of strength caused by rust. Copperweld won't rust—its original high strength is permanent.

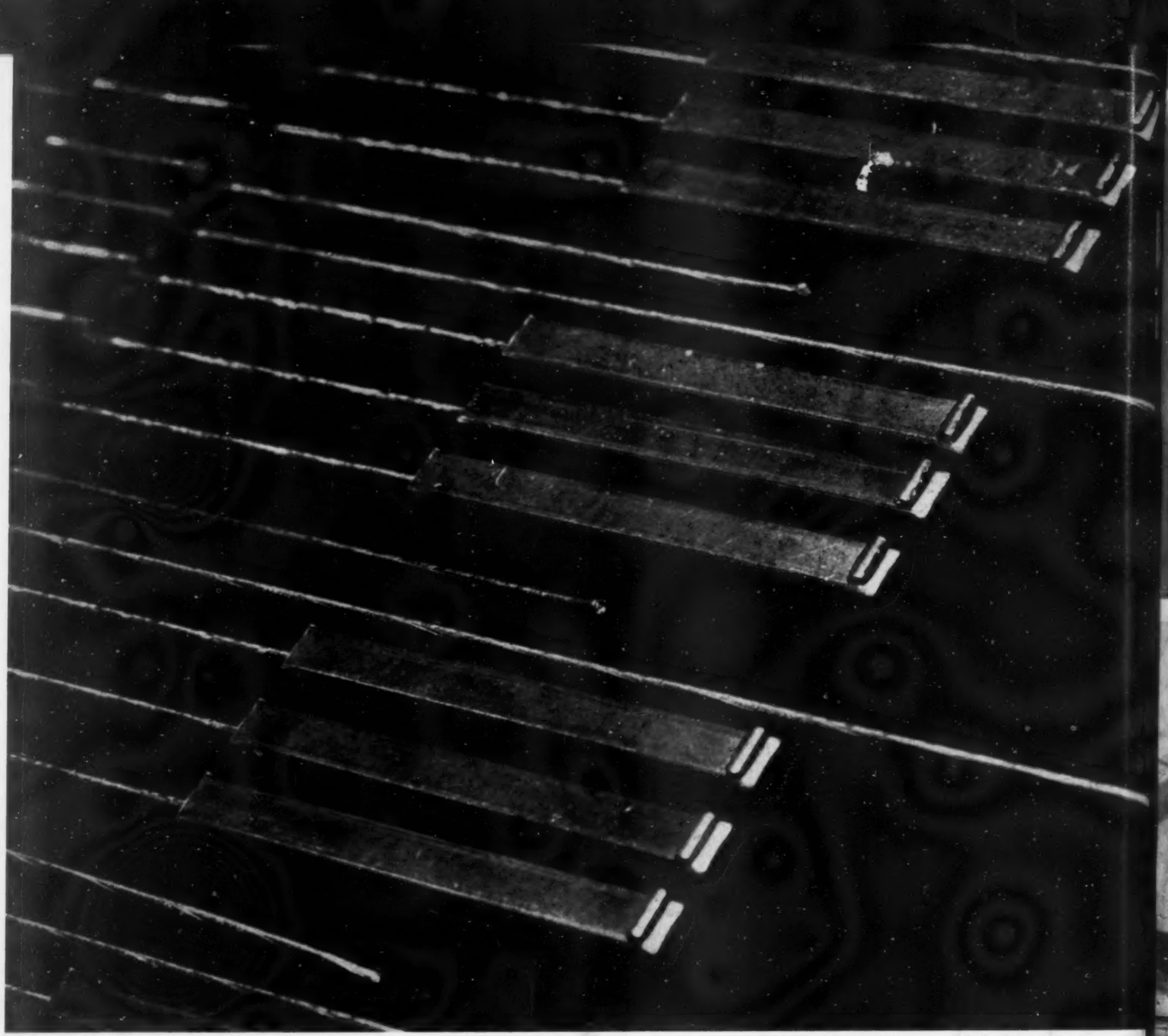
Copperweld GROUND RODS AND CLAMPS

Corrosion and high resistance contacts are eliminated when you use Copperweld Ground Rods and Clamps. All contacts are copper-to-copper. The stiff steel core insures easy driving and is permanently protected from rusting by a thick copper covering. This rod, with a rugged one-piece clamp, makes a simple, dependable ground connection.

For the Best in Telephone Products use Copperweld SOLD BY LEADING DISTRIBUTORS

COPPERWELD STEEL COMPANY GLASSPORT, PA.

SALES OFFICES IN PRINCIPAL CITIES



A greatly magnified, unretouched photograph of a reed-molding assembly for a McBerty type relay.

Backbone of Progress

This is a picture of the reed-molding assembly. It might be called the backbone of the McBerty Dial System.

The reed-molding assembly is the only moving element in the McBerty Dial System. In operation, the weights are magnetically attracted to the coils, flexing the reeds. When the coil is released, the reeds spring back to their original position. There is nothing to wear out!

When you convert to dial, investigate the McBerty system. Avail yourself of perpetual economy.

THE NORTH ELECTRIC MANUFACTURING CO., GALION, OHIO

Originators of "ALL-RELAY" Systems of Automatic Switching